Aprilia Consumer Service Spa
Technical Service and Training
Release 4 july 99

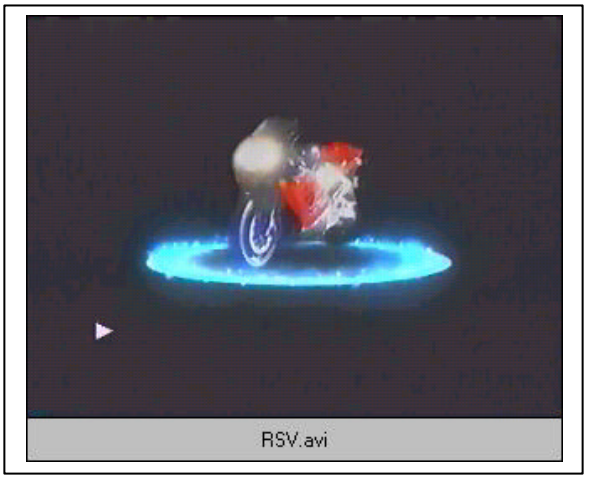
RSV 1000 Technical Training Course

RSV *Mille*

RSV 1000 INTRODUCTION

Open your third eye !

The originality of the technical decision the systematic use of solutions borrowed from the Racing Department and, above all, the passion and commitment applied to make every detail exclusive, form the basis of Aprilia's constructive philosophy. In particular, the **RSV Mille** embodies and enhances the most significant characteristics of this company's heritage, with its high-level technology, superior quality of construction and its unique and unmistakable design.
The **RSV Mille** brings a substantial change on the scene of bigh-powered super-sport motorcycles. lts manoeuvrability and easy riding - typical of two cylinder bikes - are wedded with the versatility and

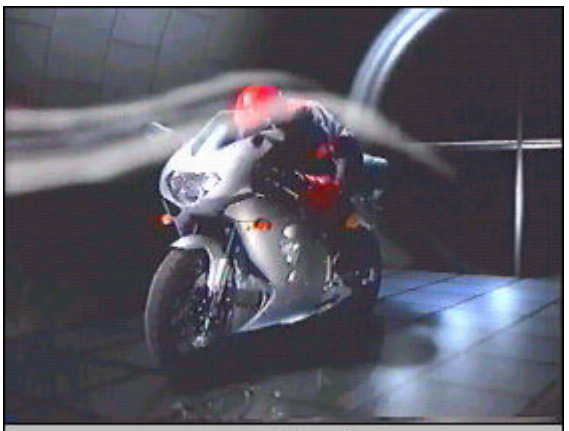


The **RSV Mille** is the best production line bike for use on the track.
A bike that guarantees a pleasant ride, on either track or road, to satisfy even the most demanding rider who wants the best as regards easy bandling, performance, exclusive quality and technology. lt is decidedly original, exclusive and performing. A motorcycle in which the love of the racing world is translated into a wealth of important details. A bike with a superior performance, occupying a price range in line with the best of Japanese competitors.

A product which represents, to all effects, a decision in style for the buyer and, for Aprilia, the first stage of further development linked with highpowered bikes.
For Aprilia, "the sense of wonder' means breaking away from set patterns, having the courage to face new challenges, in this case shaking off a paradoxically conservatile universe such as the world of high-powered super-sports motorcycles. The **RSV Mille** marks a turning point, opens a new chapter and becomes the new point of reference

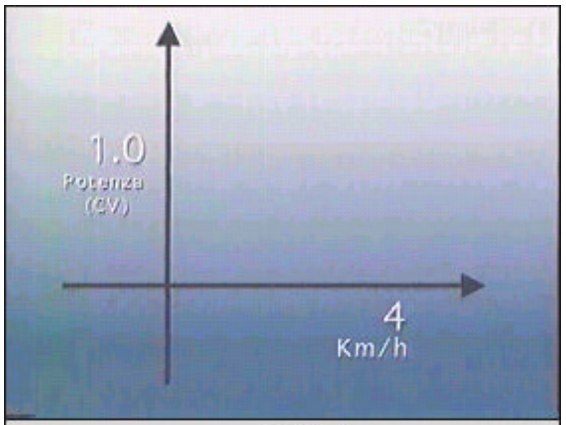
Design Concept:

Aprilia's aim in making RSV Mille was to create a motorcycle with extremely compact dimensions, one that could cleave the air in an optimumn fashion and protect the rider against the impact of the wind and high speeds.


rsvmille11.avi

The flow inside the front ait intakes has been optimazed too, as well as the position of the intakes on the fairing.

As regards the aereodynamic result obtained, the achivied CXs value of 0,3010 is the new reference point for the category.



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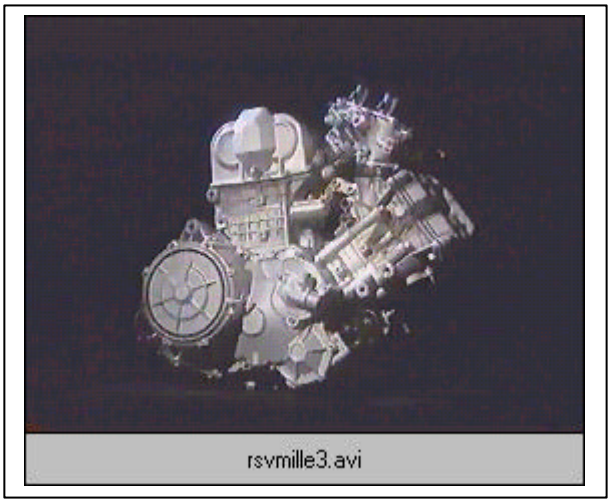
THE ENGINE

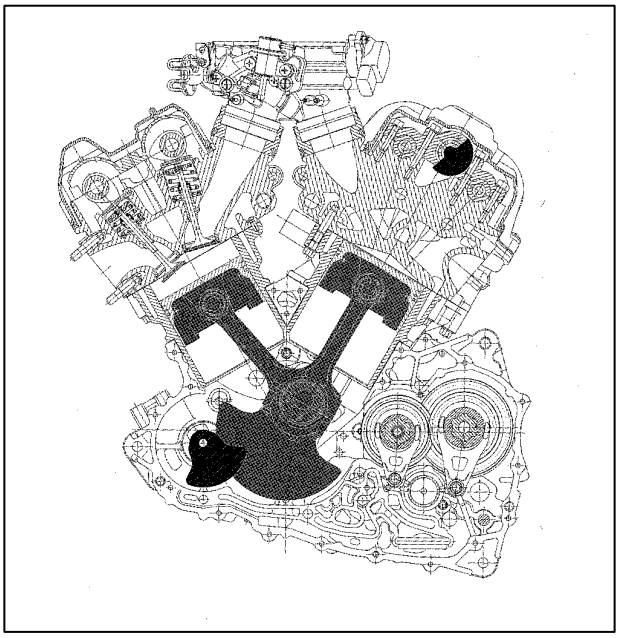
The engine fitted on the **RSV Mille** is a completely new type, conceived and developed by Aprilia's engineers. It is a 60°V-formation longitudinal two cylinder engine, with 4 distribution valves per cylinder and a double camshaft at the head, controlled by a mixed chain and gear system. It is fed by electronic ignition with air input through a system of dynamic air intakes. Ignition is of the CDI type, where the load of air and petrol is fired by the TSI system (Twin Spark Ignition) which uses two spark plugs per cylinder. Ignition is controlled by the integrate engine management system, which also controls injection.



While it is true that the 90' V engine is itrinsically balanced (the first order forces generated during the movement of the internal organs automatically cancel one another), it is equally true that the dimensione of the engine are penalized by the size of the angle between the cilinders.
The decision to use a 60° V-formation two-cylinder engine responds perfectly to the need for a lightweight, compact engine, so as not to sacrifica the design of the cycle parts with tecnical solutions and weight distribution that are not optimum.

The countershafts

The problem of the vibrations which are created inside a 60 V engine gave the designers a lot of work. The possibility of offsetting the pins of the connecting rod was discarded, as it would have required excessive widening of the dimension of the motor crankcase.
The solution found was the use of the exclusive AVDC patent (Anti-Vibration Double Countershaft).This system uses an anti-vibration by turning countershaft which, in the opposite direction to the engine shaft, balances the first order forces. The moment generated by the countershaft is, in turn, balanced by fitting a second countershaft (Smaller than the main one) inside the head of the rear cylinder. The result of adopting this technology is an engine with excellent characteristics of power, torque, with extremeily reduced vibrations.

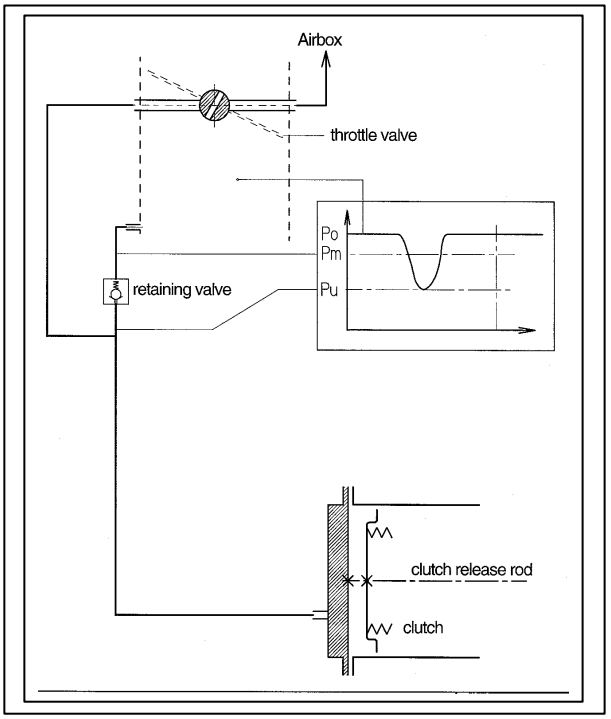


The dry sump

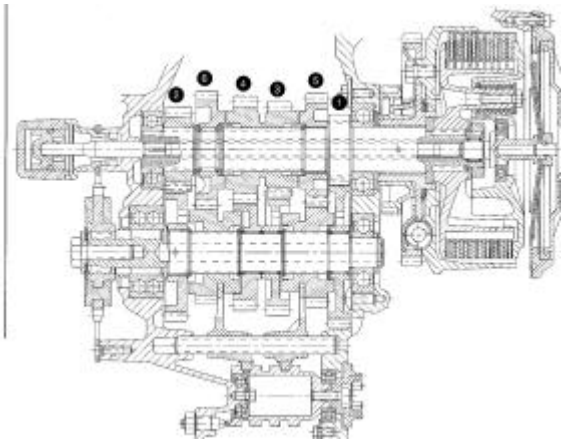
A further innovation brought by Aprilia in producing this new engine is the use of dry-sump lubrication, which allows a more rigid and compact engine block that the "wet-sump" solution. The system makes use of a second trochoid pump for recovery and an external oil tank, as well as a radiator positioned in front of the engine.

The power clutch

The **RSV Mille** has a clutch with hydraulic control, assisted by the esclusive PPC patent (Pneumatic Power Clutch) to check bouncing of the rear wheel. When decelerating suddenly, the weight of the motorcycle is transferred instantly to the front, lightening the rear axle. In high-powered two-cylinder engines this phenomenon is accentuated by the high “engine braking" effect; this can cause the so-called bouncing, or the tendency of the rear wheel to block and lift off the ground, endangering the stability of the bike and, consequently, the vehicle's performance and safety.
Aprilia has found the ideal solution to this problem exploiting the variations in pressure which occur in the intake ducts when the throttle is opened and closed, to lighten the load on the clutch springs. By connecting the intake ducts to a "lung" situated at the side of the clutch group, the vacuum created when the throttle is closed decreases the load exerted on the disks by the springs, while when the throttle is opened again the clutch resumes operation under normal weight conditions, thus transferring all the power to the rear wheel.



This system also allows reduction of the force applied on the lever on the handlebar, when the bike is running at low rev speeds.

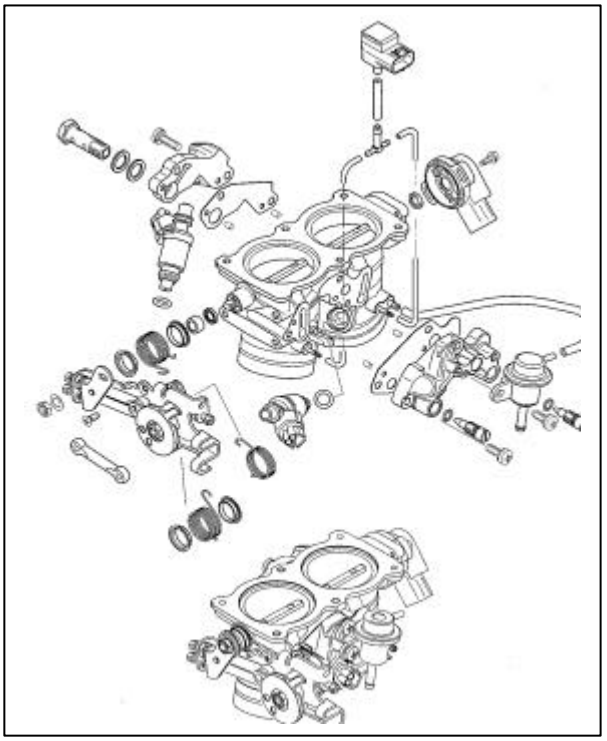


development of the product

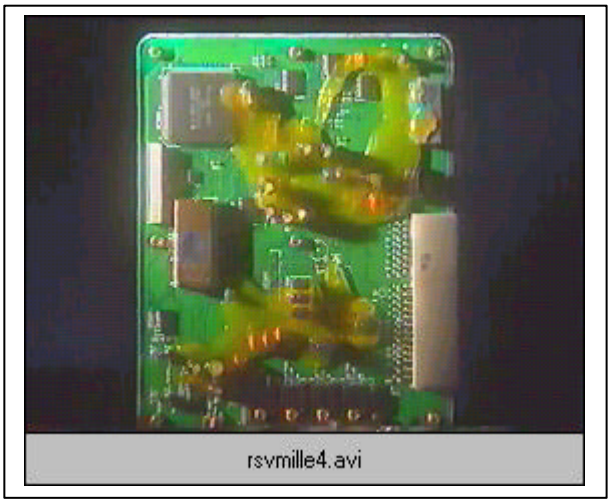
Injection

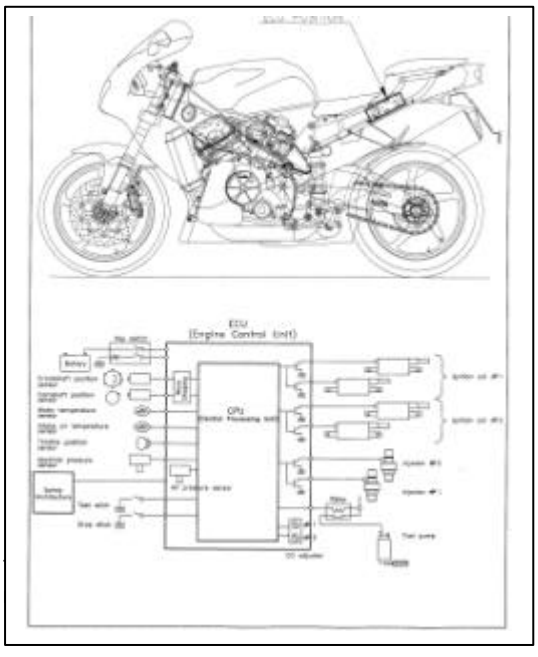
The need for suitable control of the powerful engine of the **RSV Mille** led the Aprilia designers to adopt an electronic management system built into the engine. All the fondamental operating parameters are constantly monitored by a sophisticated electronic controls unit which, on the basis of the data received, control operation of both the injection system and the ignition system.

The injectors are fed by a pump which produces a constant pressure of 330 Kpa. The throttle bodies have a diameter of 51 mm. Fresh air is taken in through ducts which make use of dynamic pressure when the motor-cycle is moving, sending fresh air into a large volume airbox.



The entire injection/ignition system is also equipped with a continuous Selfdiagnosis circuit (both on starting and when the bike is running); this is able to indicate any malfunctions of the system directly on the dashboard, without the aid of complicated and expensive external equipment.

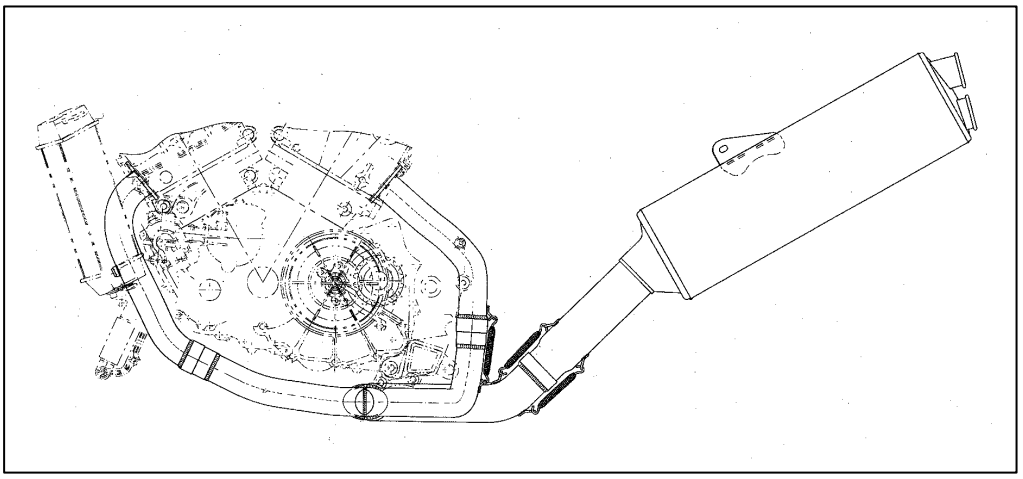




The exhaust

The exhaust system of the **RSV Mille** originates as the reply to four very precise requests: light weight, aerodynamic line, respect for the environment and for approval standards.
The choice of the "2 in 1 " exhaust proved to be the most appropriate since, while obtaining an internal volume of over 9 litres, the bulk and weight are lower than those of a l'2 in 2" exhaust.
The exhaust of the **RSV Mille** made completely of stainless steel, which ensures long life and lasting good looks.

As regards respect for the environment, the engine of the **RSV Mille** complies with the parameters of the future European standards (EURO 1, which comes into force in 1999); this result is achieved without the aid of any type of catalyst, as a further guarantee of performance and attention to these problems.

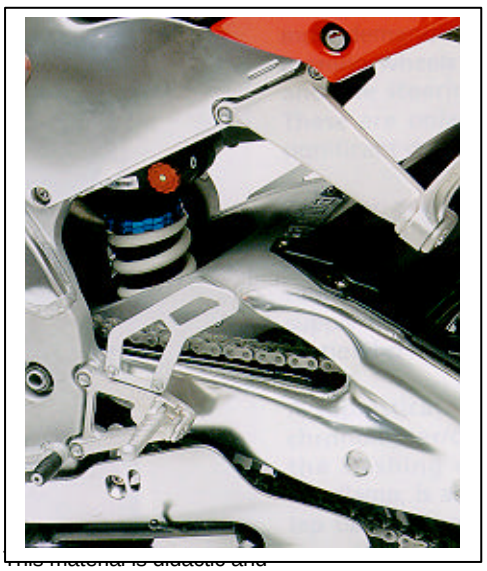


CYCLE PARTS

Jewel within the jewel, the cycle parts of the **RSV Mille** must be considered to all effects a true masterpiece of engineering. As beautiful as a work of art, impeccably but above all efficiently finished, instinctive and easy to drive, to quarantee optimum exploitation of all the engine power.
The best engineers in the Aprilia racing department designed the frame, giving it the most in terms of planning and knowledge of structures, choice of materials, weight distribution and dynamic behaviour.

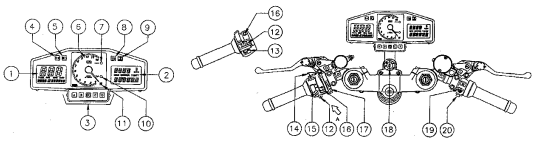
Particular care was taken with the torsional stiffness (with a record value of 650 Kgm) and bending resistance of tbc frame, fondamental elements as regards riding precision and safety.

The splendid rear fork with differentiated arms controls, by means of linka-ges, a multi-adjustable shock-absorber with built-in "piggy-back" tank. The rear wheel bump position is 135 mm.
At the front the 43 mm Showa "upside-down" fork allows a bump position of 120 mm.
The cycle parts of the **RSV Mille** are supported by a dry weight of only 189 kg, optimally distributed with 49.2% on the front axle and 50.8% on the rear axle.



COMPONENTS

Every slightest detail of the **RSV Mille** receives the same meticulous care from Aprilia, to transfer dove, care and enthusiasm into every bike that the company produces.



N°	DESCRIPTION	
1	MULTI-FUNCTION DIGITAL DISPLAY WITH:	
	DIGITAL SPEEDOMETER	
	(ISTANTANEOUS AND AVERAGE SPEED)	
	DIGITAL ODOMETER (TOTAL) (PARTIAL)	
2	MULTI-FUNCTION DIGITAL DISPLAY WITH:	
	DIGITAL CLOCK	
	COOLING LIQUID TEMPERATURE INDICATOR	8
	DIGITAL VOLTAGE BATTERY	
	CHRONOMETER WITH 40 MEMORIES	
	DIGITAL DIAGNOSTIC	
3	MULTI-FUNCTION COMMAND KEY:	
A	MAX/AVARAGE SPEED SELECTORS FUNCTIONS	
B		
R	RESET	
C	GEAR CHANGE SIGNALING	
D	MULTI-FUNCTION DIGITAL DISPLAY/FUNCTIONS SELECTOR	

N°	DESCRIPTION	
4	TURN INDICATOR TELLTALE	3
5	HIGH BEAM TELLTALE	1
6	RPM INDICATOR	
7	RUNAWAY SPEED RATE TELLTALE	
8	FUEL RISERVE INDICATOR	7
9	SIDE STAND TELLTALE	
10	OIL TELLTALE	10
11	NEUTRAL TELLTALE	16
12	TURN SWITCH	3
13	HORN SWITCH	6
14	PASSING/CHRONOMETER SWITCH	1
15	LIGHTS SWITCH	15/16
16	HIGH/LOW BEAM SWITCH	1/2
17	CHOKE	5
18	IGNITION SWITCH AND STEERING LOCK	
19	ENGINE STOP SWITCH	13/14
20	START SWITCH	19

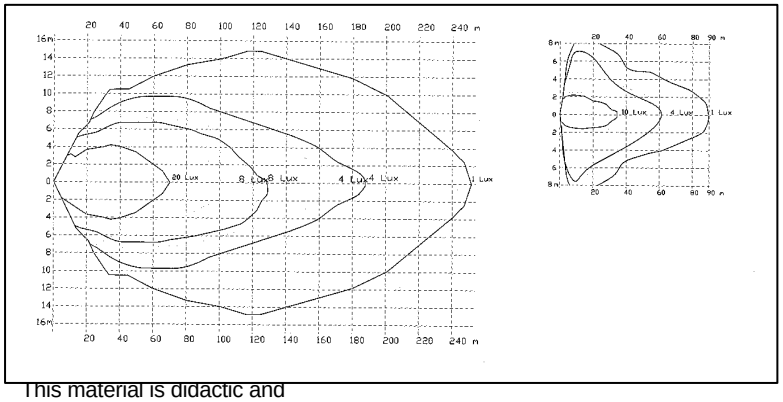
Many parts contribute to make the **RSV Mille** a unique and unrivalied rnotorcycle: the aluminium rear frame that supports the saddle, the beautiful exposed welds, the adiustable controls on both handlebar and pedals (where micrometric adjustment by means of a cam offers a solution to satisfy even the most demanding motorcyclist), the Brembo wheels in aluminium alloy and the steering shock absorber. These are only some of the most significant details.

Another great innovation of this rnotorcycle is the analog and digital dashboard. It is to all effects a real computer on board, able to supply the rider wíth all the information ho needs at any time.

A sophisticated, exclusive digital chronometer/clock, controlled by the flashing of the main beam headlamp, is able to store up to 40 lap times. The "red zone" on the rev counter is indicated by the flashing of a warning light (which may be set by the rider at the desired rev speed), allowing him to choose the best moment to change gear and gain precious seconds when performing the operation.

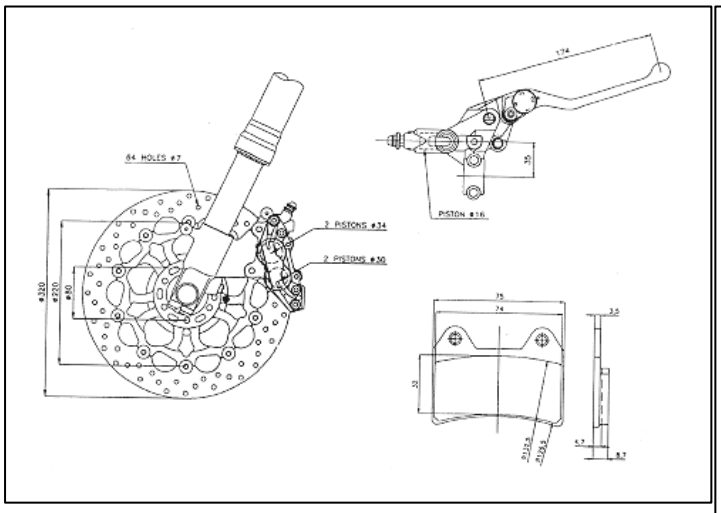
The headlamp

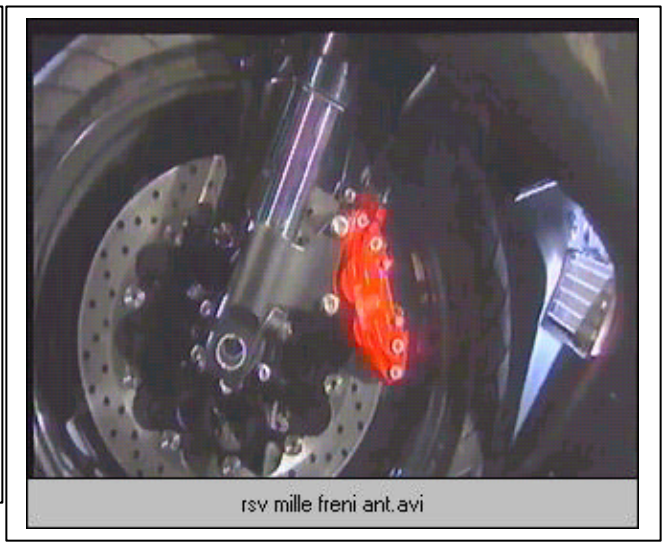
The headlamp is a particulary distinctive feature of the **RSV Mille,** characterizing its appearance and making it immediately recognizable as soon as it starts flashing. It is a triple headlamp, in which the power of the main beam allows a broad, powerful and homogeneous beam of light, to make night riding even more safe and effective. Two 55 Watt halogen lamps are housed inside parabolas developed on the computer with the technology of complex surfaces.



The Brakers:

The Brakers of RSV, developed in close collaboration between Brembo and Aprilia, have calipers at the front with 4 piston with different diameters (34 and 30 mm) wich act on steel disks with diameter of 320 mm.
At the rear the bike is fitted with 220 mm disk and caliper with double opposed piston (d=30 mm)





In terms of product quality, the **RSV Mille** has achieved an even higher internal standard which already places Aprilia at the top of the market. Quality means not only product quality but also, and above all, design quality, as is demonstrated by the ISO 9001 certification obtained for ali production phases.
To assure you that this bike is reliable and a really good buy, Aprilia covers the **RSV Mille** with a MotoGo Three-Year Guarantee.

SECTION 01: INJECTION SYSTEM

1.1 PREFACE: INTRODUCTION ON THE INJECTION-IGNITION SYSTEM

The injection-ignition system is of the **" alpha/n, D/J"** type, in which motor speed and throttle position are used as the main parameters for the quantity of aspirated air; knowing the quantity of air, the fuel level is dosed as a function of the performance required. Other system sensor atmospheric pressure, air temperature, water temperature allow basic settings to be corrected in the event of specific conditions. In addition, motor speed and throttle angle allow the optimum spark, advance to be calculated under any operating condition.

Electronic injection-ignition system.

The application of an electronic control injection-ignition system to eight-stroke-cycle engine, optimizes their use, providing a higher specific horsepower together with a lower specific consumption, and reducing the unburt elements in the exhaust gases. These advantages are got thank to a more exact air-fuel ratio metering and a good spark advance control. This equipment consists of three circuits: Fuel circuit, Sucked air circuit and Electric circuit.

Influence of air-fuel ratio and of spark advance.

Air-fuel ratio and spark advance are key factors for the optimum functioning of the engine, and so is their management. The air-fuel ratio is fhe ratio of air and fuel (weight) supplied to the engine: the ideal (stechiometric) ratio is achieved when full combustion is ensured. Too much or too little air will produce a lean or rich mixture, respectively, which affects horse power and fuel consumption (see fig. 1, as well as the pollutant content in exhaust emissions see fig. 2).
The electronic spark advance management optimises engine performance: peak power, transient, consumption, pollution.

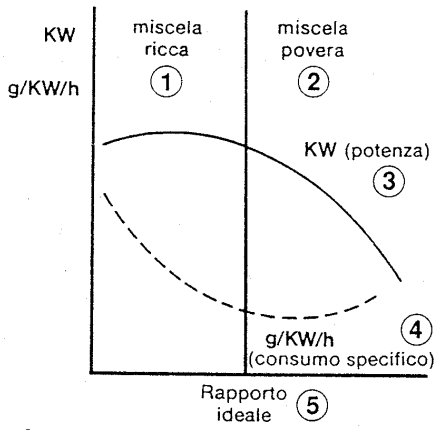


Fig.1

1) Miscela ricca / Rich mixture / Mélange riche / Reiches Gemisch / Carburación rica
2) Miscela povera / Lean mixture / Mélange pauvre / Armes Gemisch / Mezcla pobre
3) Potenza / Horsepower / Puissance / Leistung / Potencia
4) Consumo specifico / Specific consumption / Consommation spécifique / Spezifischer Verbrauch / Consumo específico
5) Rapporto ideale / Ideal ratio / Rapport idéal / Ideales Verhältnis / Relación ideal

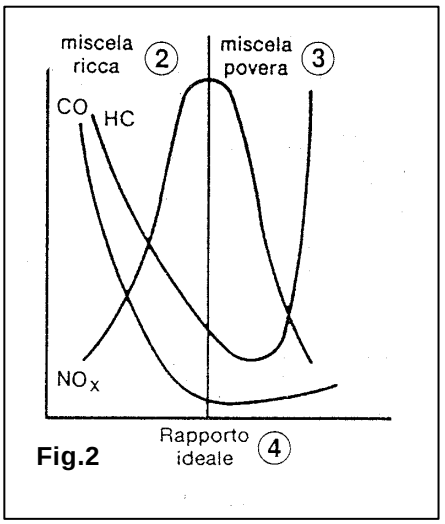


Fig.2

1) Pollutants/ Polluants/ Umweltbelastende Abgase /Contaminantes
2) Rich mixture / Melange riche / Reiches Gemisch / Mezcla rica
3) Lean mixture / Melange pauvre / Armes Gemisch / Mezcla pobre
4) Ideal ratio / Rapport ideal / Ideales Verhaltnis / Proporcion ideal

Operation phases.

NORMAL OPERATION

When the engine has a normal temperature, the control unit –ECU- calculates the phase, the injection time and the spark advance through interpolation of the corresponding store maps, as function of the r.p.m/pressure (..and other input)

STARTING PHASE

When the ignition switch is operated, the control unit feeds the fuel pump for a few seconds and receives the throttle opening angle and engine temperature signals. At the start, the control unit receives the engine revolutions and phase signals, which allow the injection and ignition control. To make the starting easier, in addition to the use of the Starter, the base metering is enriched, conforming to the coolant temperature.

OPERATION DURING ACCELERATION/DECELERATION

During acceleration, the system increases the delivered fuel amount, so to have a better driving. The acceleration condition is detected when the throttle opening angle increases remarkably; the enrichment factor will be proportional to the pressure change and to the cooling water temperature. A decrease of the throttle opening angle shows a deceleration and causes a reduction of the delivered fuel.

1.2 RSV 1000 FUEL INJECTION SYSTEM

The main features of the RSV MILLE fuel injection system are as follows:

1. Possibility of setting the right air/fuel mixture in real time on the basis of the throttle valve opening, the inlet manifold pressure and the engine running speed.

2. Improved performance and acceleration response thanks to the SW which compensates the air/fuel mixture in all engine running conditions.

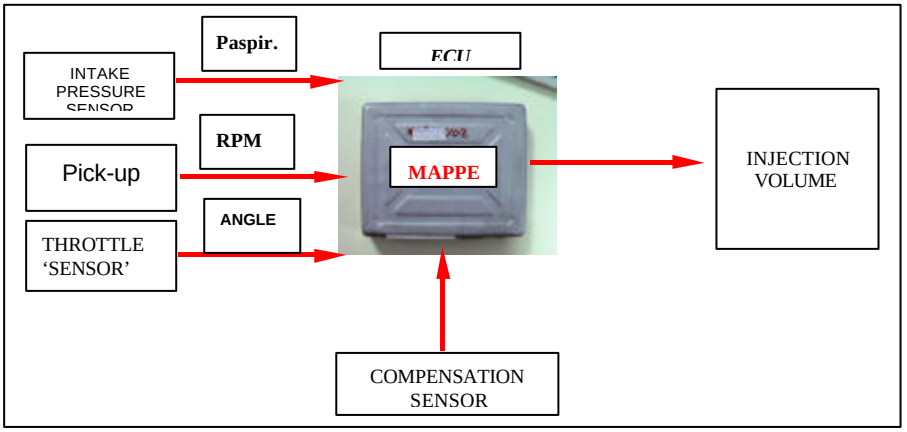
3. Clean exhaust emission thanks to the fuel injection system.
   Variable timing, depending on engine running states. At present, the system is not set up for the use of the Lambda probe.

To determine the injection volume, vary the opening time of the injector; the greater the volume, the longer the injection time. To determine the injection time, there are a number of different sensors which increase or reduce the injection volume on the basis of the atmospheric pressure, atmospheric temperature, engine coolant temperature, intake air pressure, accelerator position and engine rpm.
The basic volume is given by the injection mapping and the sensors send the data to the electronic control unit to compensate this volume in line with the running conditions of the engine/bike. There are two maps in the E-Prom:

1. **Map** a / n → This is the “basic” map that mainly covers the high rpm sector. The injector opening time, i.e. the injection volume, is determined on the basis of the rpm and the throttle valve opening angle.

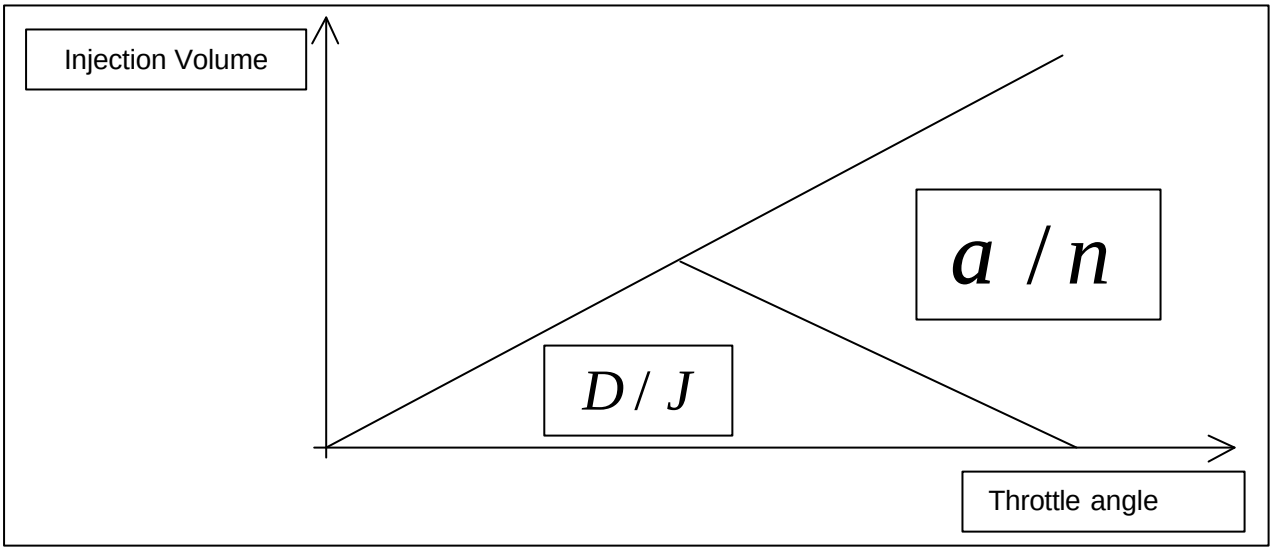
2. **Map** D/J → The D/J map covers the engine low/medium rpm sector. The idling system is governed by the D/J map. The volume of fuel injected depends on the manifold pressure and the rpm.

The figure shows the logic diagram for the Injection Volume calculation system.



The control unit software switches between the DJ map and the alpha/n map on the basis of the engine running conditions. The injection volume also depends on the other factors provided by the compensation devices, illustrated later on.

The switch from D/J to alpha/n occurs gradually (See down figure) :



As shown in the above figure, the D/J map is almost 100% active in low load running conditions (e.g. engine in neutral).
The alpha/N curve becomes predominant in power delivery conditions.

Remember that the control unit is connected electrically to the instrument panel, and that there is also the self-diagnosis function. When in the diagnosis option, the panel displays the fault codes that act as a guide in the servicing.

Compensation devices:

1. **Atmospheric pressure sensor**

Positioned inside the control unit box. Reads the Patm.
The control unit normally reduces the injection volume in low atmospheric pressure conditions

2. **Engine coolant temperature sensor**

This sensor reads the coolant temperature. If the temperature reading is low, the control unit increases the injection times

3. **Intake air temperature sensor**

This sensor reads the temperature of the intake air; if the temperature is low, the injection time is increased

4. **Gear position (idling switch)**

This logic sensor verifies whether or not the gearbox is in the neutral position. The signal also affects the phasing.

Other significant compensation factors:

- **Battery voltage**
- **Starting compensation (engine warming)**
- **Delta Alpha compensation:**
-
  - boosts the engine fuel supply during rapid acceleration
  - cuts off the fuel during deceleration

-
- **Timing control**

The times are controlled by the reading of the position of the crankshaft and the position of the camshaft. The control unit also detects the starting phase, injecting the fuel into the cylinders asynchronously.

Crankshaft sensor → Reads the position of the crankshaft, discretizing angles of 60°
Sends a voltage to the control unit, like any pick-up.
This signal controls the fuel pump via the ECU.

Camshaft position sensor → Reads the position of the camshaft and sends the signal to the ECU. The sensor reads the position of the front cylinder only.

Injection stop control

Rpm limiter:

Software control. The control unit stops the injection if the rpm are excessive.

Deceleration:

The injector function is disabled during deceleration with the throttle valve closed.

Side stand switch:

Prevents starting when in running conditions
Switches the bike off immediately if a gear is engaged with the side stand down

Safety systems

Kick back Prevention:

At about 300 rpm (if the rpm have been over 800 rpm) the control unit de-energizes the coil signal to prevent a possible kick-back in the pistons when turning the bike off.

Tip over sensor:

If the bike tips over, the tip over sensor stops the injectors' control signal and fuel pump. The sensor is a mechanical switch already used on other bikes on the market. Reset the CPU by switching off the bike to re-enable the normal functioning of the control unit.

Side stand and clutch switches (possible conditions):

Side stand		Gear			Signals	
SW	Conditions	Neutral SW	Clutch SW	Conditions	SS	CLT
CLOSE	Housing	CLOSE	CLOSE	Ungeared	LOW	LOW
			OPEN			
		OPEN	CLOSE			
			OPEN	Geared		HIGH
OPEN	Standing	CLOSE	CLOSE	Ungeared		LOW
			OPEN			
		OPEN	CLOSE		HIGH	HIGH
			OPEN	Geared		

1.3 SELF-DIAGNOSTICS FUNCTION:

The self-diagnostics function is part of the ECU software and is a valid aid to trouble-shooting in the electronic injection system.

HOW THE FUNCTION WORKS:

With the control unit and dashboard connected and the key “on”, the multi-function LCD displays the message “EFI” instead of the temperature reading for about 3 seconds

If the EFI message disappears after 3 seconds and TEMPERATURE appears (°C, °F or COLD), this means that the injection control unit has found no static errors in the injection components. To check the crankshaft and camshaft sensors, make a starting attempt lasting > 4 sec.

If EFI DOES NOT appear, this means there is no connection between the display and the control unit (DIAG lead disconnected → check wiring)

If the EFI message persists, this means that the control unit has found a fault in the sensors/components. Go into the Dealer Mode.

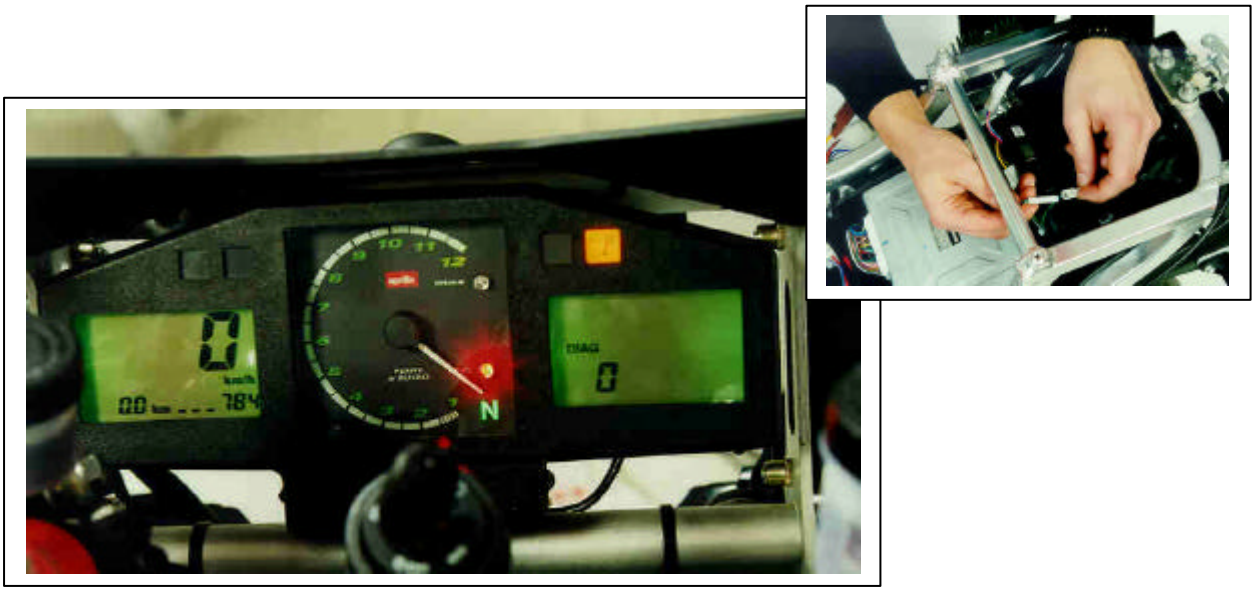
The diagnostics function is divided up as follows:

- **USER MODE:** If there is a fault, the user will see the **“EFI”** message remaining on the display after starting. This is the only sensors/coils fault message that can be seen by the user

- **DEALER MODE:** Using connector 68, the mechanic will be able to read the corresponding fault code on the LCD

How to access DEALER MODE:

1- Ground the control unit diagnostics terminal via connector 68 (see diagram). The message DIAG will appear on the display



2-If everything is functioning perfectly, the following figures may appear on the display:

-1, 0, 1 (throttle valve opening standard values – SEE ***CO*** SETTING)

3- If there are any faults, the fault codes will appear in sequence. The sequence will keep repeating until you exit the Dealer Mode.

!!!! AFTER REPAIRING THE FAULT SWITCH THE BIKE ON AGAIN TO CHECK

IMPORTANT NOTES:

Whether or not the bike can be turned on in the Dealer Mode depends on the type of fault.

The ECU must be on for the fault codes to be saved; if the bike is switched off (STOP Condition) the codes memory will be erased

There is no SW/HW control on the injectors

1.4 FAULTS TABLE

FAULT CODE	COMPONENT INVOLVED	CAUSE	NOTES
11	CAMSHAFT SENSOR	Sensor not connected, faulty wiring, sensor broken	START ENGINE (t>4 sec)
12	CRANKSHAFT SENSOR	Sensor not connected, faulty wiring, sensor broken	START ENGINE (t>4 sec)
13	INTAKE PRESSURE SENSOR	Sensor not connected, faulty wiring, sensor broken	ENGINE RUNNING OR ENGINE STOPPED
14	INTAKE/ATMOSPHERIC PRESSURE SENSOR	Increased differences between sensor signals	ENGINE RUNNING OR ENGINE STOPPED
15	THROTTLE SENSOR	Sensor not connected, faulty wiring, sensor broken	ENGINE RUNNING OR ENGINE STOPPED
21	COOLANT TEMPERATURE SENSOR	Sensor not connected, faulty wiring, sensor broken	ENGINE RUNNING OR ENGINE STOPPED
22	AIR TEMPERATURE SENSOR	Sensor not connected, faulty wiring, sensor broken	ENGINE RUNNING OR ENGINE STOPPED
23	ATMOSPHERIC PRESSURE SENSOR	Sensor – inside control unit – defective	ENGINE RUNNING OR ENGINE STOPPED
33	COIL 1 CYLINDER1	Coil not connected, faulty wiring, sensor broken	ENGINE RUNNING
34	COIL 2 CYLINDER 1	Coil not connected, faulty wiring, sensor broken	ENGINE RUNNING
35	COIL 1 CYLINDER 2	Coil not connected, faulty wiring, sensor broken	ENGINE RUNNING
36	COIL 2 CYLINDER 2	Coil not connected, faulty wiring, sensor broken	ENGINE RUNNING
41	TIP OVER SENSOR	NOT CONNECTED DEFECTIVE	ENGINE RUNNING OR ENGINE STOPPED
NO START	CONDITIONS AT START	- Tip over conditions - Safety logic not satisfied - Two defective coils on same cylinder	→ See table

WHAT TO DO WHEN A FAULT CODE APPEARS:

1. CHECK COMPONENT WITH TESTER
2. CHECK CONTACTS (SENSOR/WIRING– WIRING/CONTROL UNIT)
3. CHECK WIRING

TROUBLE SHOOTING:

WHAT TO DO IF THE ENGINE DOESN'T START AND NO FAULT IS SHOWN ON THE SELF-DIAGNOSTICS SYSTEM

- Check the fuel pump
- Check the injectors
- Check that the anti-theft system connector is connected
- Check the key switch
- Check the STOP-RUN control
- Check the 30 Amp fuses and 15 Amp fuses B and E
- Check the engine stop relay
- Check the battery
- Check the safety system logic (diode box, switches)

START AND RUN POSSIBILITY:

If a fault is detected, the control unit may:

- stop the bike
- allow running but not starting
- allow running and starting

as described in the table:

FAILURE	START POSSIBILITY	RUN POSSIBILITY
CAMSHAFT SENSOR	**NOT POSSIBLE**	POSSIBLE
CRANKSHAFT SENSOR	**NOT POSSIBLE**	**NOT POSSIBLE**
MANIFOLD PRESSURE SENSOR OR PRESSURE SENSOR SIGNAL	POSSIBLE	POSSIBLE
THROTTLE POSITION SENSOR	POSSIBLE	POSSIBLE
COOLANT TEMPERATURE SENSOR	POSSIBLE	POSSIBLE
INTAKE AIR TEMPERATURE SENSOR	POSSIBLE	POSSIBLE
ATMOSPHERIC PRESSURE SENSOR	POSSIBLE	POSSIBLE
IGNITER:		
IGF11 OR IGF12	POSSIBLE	POSSIBLE
IGF11 AND IGF12	POSSIBLE (ONE CYLINDER ONLY)	POSSIBLE (ONE CYLINDER ONLY)
IGF21 OR IGF22	POSSIBLE	POSSIBLE
IGF21 AND IGF22	POSSIBLE (ONE CYLINDER ONLY)	POSSIBLE (ONE CYLINDER ONLY)

OPERATION - DASHBOARD KEYS

[A] [B] [R] [C] [D]

1. SEGMENTS OPERATION CHECK:

Press keys [A] and [B] and turn the key from OFF to ON: all segments stay lit as long as [A] and [B] are pressed.

2. KM/H, MPH

Press key [A] for 5 seconds =:> numbers and km/h (mph) flash

Press key [B] to change unit of measurement

Confirm with [A] pressed for about 5 seconds.

3. INSTANTANEOUS, MAXIMUM AVERAGE SPEED (only with instantaneous S = 0)

Instantaneous speed => press key [B] for about 1 second
Maximum speed => press key [B] for about 1 second
Average speed => press key [B] for about 1 second

a) 1st partial reset:
instantaneous speed on display => press key [R] for about 3 seconds => 1st partial = 0

b) maximum speed reset:
maxS and 1st partial on display => press key [R] for about 1 second => maxS = 0.

c) average speed and 2nd partial reset:
avgS and 2nd partial on display => press key [R] for about 1 second => avgS = 0,
2nd partial = 0

With the display showing maxS or avgS and insS becomes > 0 the display shows insS.

5. EXCESS RPM WARNING LIGHT (ONLY WITH ENGINE OFF)

-Press [C] for t < 1 second => set value displayed for seconds
-Key pressed for more than 1 second - pointer moves at 1000 RPM/step as long as [C] is pressed
-If the key is released and then pressed again within 3 seconds for less than 1 second the setting increases by 100 RPM/pulse.
-If key [C] is not pressed for more than 3 seconds the setting is stored (confirmed by lighting of indicator light).

6. MULTIFUNCTION

Coolant temperature and clock => [D] =>
Battery voltage => [D] =>
Set hours (Press LAP) =>
Set minutes (Press LAP) =>
Set °C/°F (Press LAP) => go back to

b) Stop watch

Press and hold [LAP] and then (within 0.7 seconds) press key [D] to start the stop watch.

b. 1) Press [LAP] ==> stop watch starts (the [LAP] key is not enabled for 10 sec.)

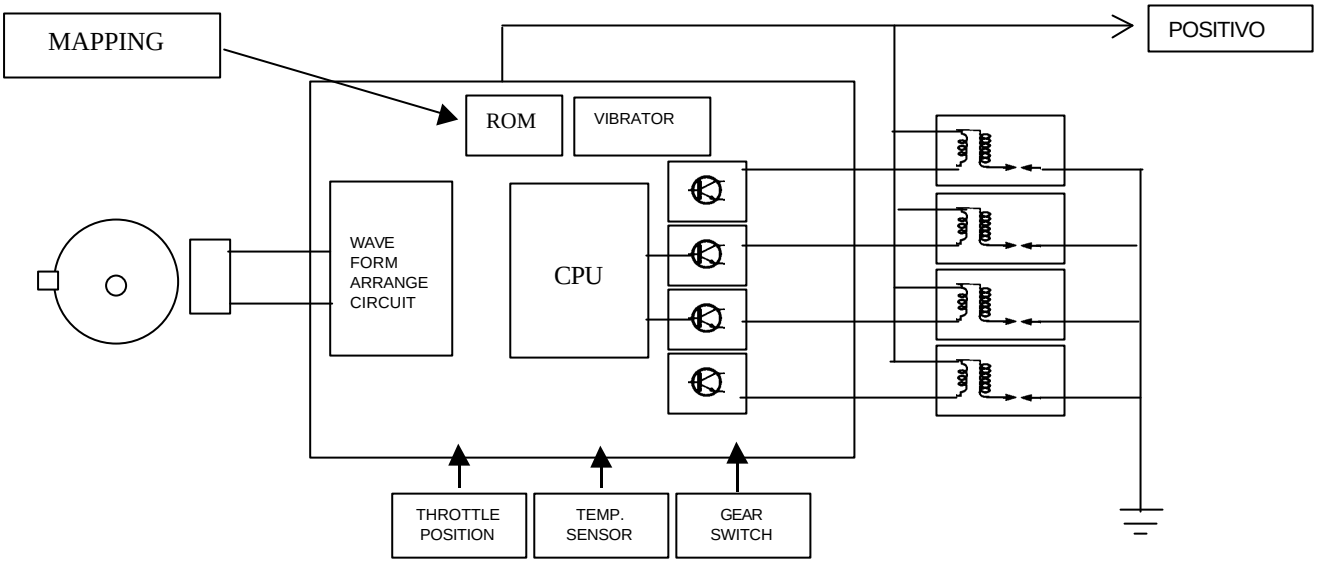
b.2) Starting from timing =:> press [B] => display shows first acquired time => press [LAP] to re-display times in sequence
-Press [B] to go back to timing
-Press [A] + [LAP] for 2 seconds to zero memories

b.3) To exit timing press [D] and then [LAP] **(temperature and clock will appear on** display).

6. **Switch off SERVICE** => press [LAP] and [R] for 5 seconds.

SECTION 2: IGNITION SYSTEM

The ignition system is controlled by the control unit. The system is a normal one, known as a digital transistorised ignition system, which sets the correct timing on the basis of the engine rpm and throttle position. It is made up of the crankshaft sensor (pick up coil), control unit, two ignition coils and spark plugs.



1. The ignition coil power supply is governed by the side stand safety circuit and by the gear position.

2. The timing is constantly controlled by the throttle position and the rpm

The devices described below affect the timing in the stopping or starting of the ignition system.

Crankshaft sensor:

The engine pick up coil produces a signal when it meets the projecting part of the magneto flywheel.

The wave generated is sent to the control unit which calculates the engine rpm; this signal determines the timing.

Throttle position sensor:

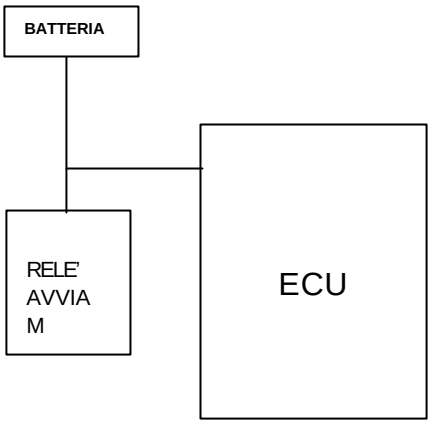
This sensor, mounted on the throttle body, has a variable resistance which changes the opening value of the throttle. On the basis of this signal, the control unit sets the timing in response to the engine rpm.

The timing mapping is made up of two factors: the throttle position and the engine rpm.

The ignition is inductive and not the capacitive discharge type. ! NEVER SHORT CIRCUIT TO GROUND THE L.T. LEADS TO THE COILS

CONTROL STRATEGY

In the ignition phase, the control unit reads the starting, as shown in the separate figure.

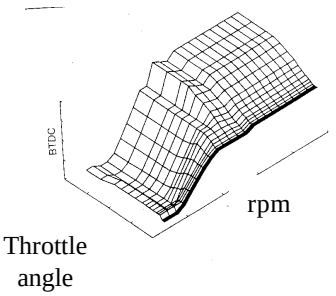


The ignition phase starts in this way (asynchronous/synchronous phase):

1. The control unit reads:
   - coolant temperature
   - throttle angle
   - engine rpm
   - Patm.
   - Battery voltage

These values determine the ignition time when the engine is started.

The mapping, based on the timing, is based on BTDC (Before top dead centre), and depends on the throttle opening angle and the engine rpm.



2. Cylinder recognition

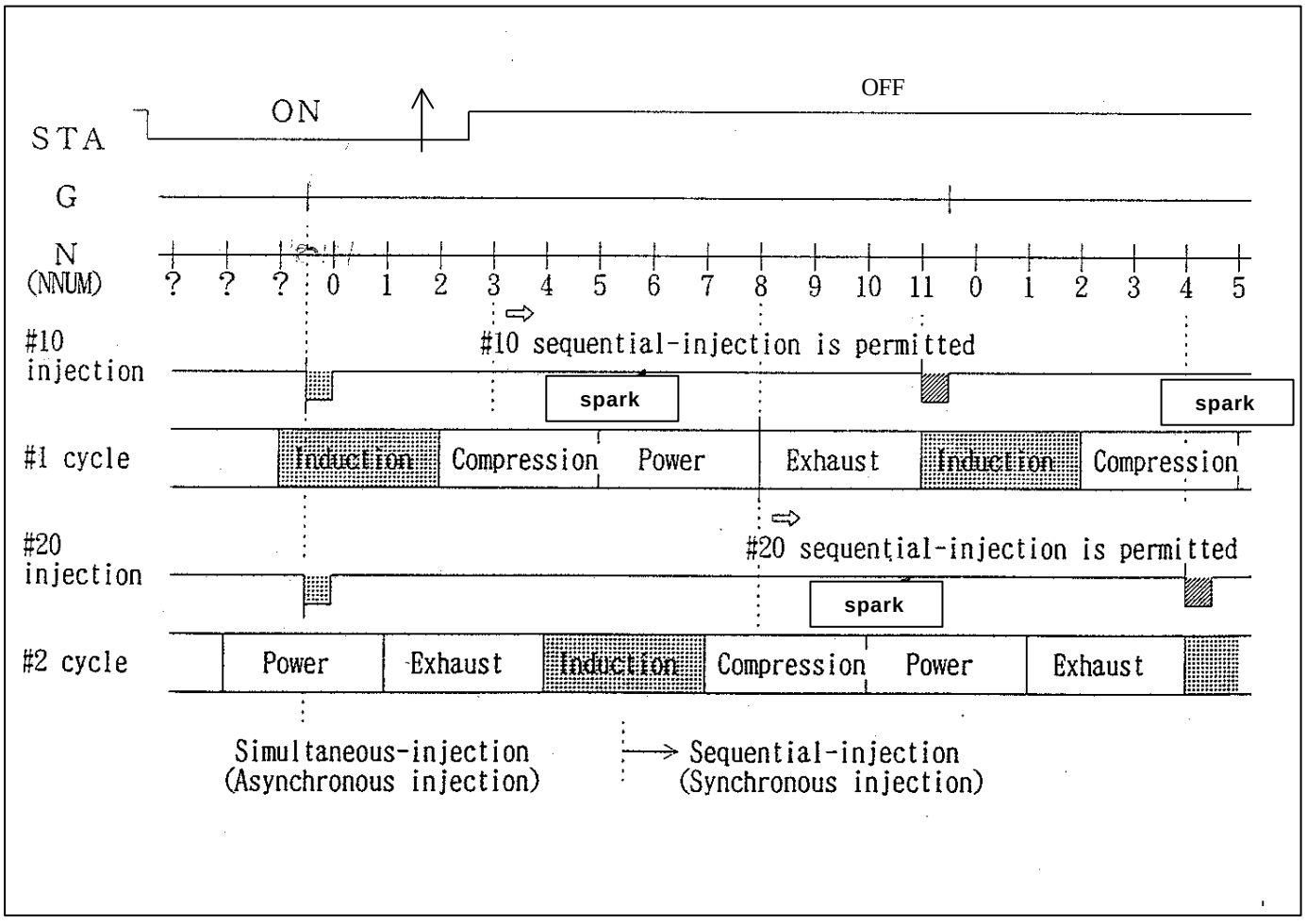
The camshaft and pick up sensors send signals that are clipped by the ECU.

The camshaft sensor sends one signal for each cycle (INT-COMPRESS-IGNITION/EXPANSION-EXHAUST), corresponding to an angle of 720°

The camshaft sensor sends 12 signals for each rotation of the crankshaft, i.e. one signal every 60°.

The first camshaft pulse enables the resetting of an internal counter which starts the synchronous ignition phase and cylinder recognition.

The following phase is known as asynchronous as both the injectors inject fuel into the ducts. The ignition phase is illustrated in the diagram below.



IGNITION:

The HT coils control is linked to the pick up signal after the recognition of the cylinders (see figure above).

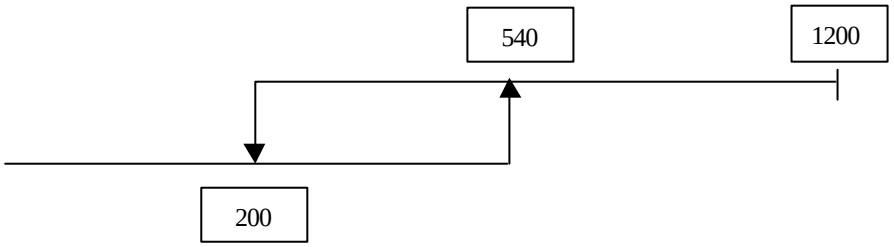
At low rpm (< 540) the ignition is set by the clipped signal of the pick up. The CPU gives consensus to the ignition only. These are “fixed spark timing” and “ fixed dwell timing” conditions.

At medium rpm levels, the spark dwell timing is fixed but the spark advance timing varies.

At high rpm (>3500) the ignition timing is calculated by the ECU and suitably compensated (calculated spark and dwell timing conditions).

IDLING:

Applies to the 200 to 1200 rpm range. A hysterisis cycle is followed (as shown in the figure); the spark and advance times are fixed.



SECTION 3 : DESCRIPTION OF ELECTRONIC INJECTION SYSTEM

The RSV1000 electronic injection system is made up of the following components:

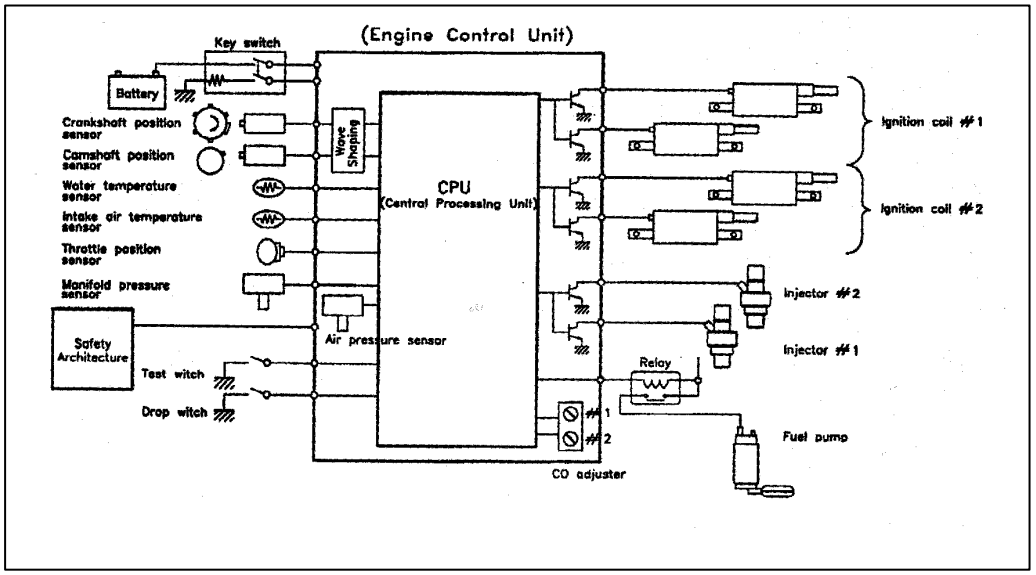
1. Electronic control unit
2. Sensors (shaft position, temperature, pressure...)
3. Actuators
4. Ignition coils
5. Fuel pump

The ECU also contains the static-inductive ignition circuit.

3.1 THE E.C.U.: ELECTRONIC CONTROL UNIT

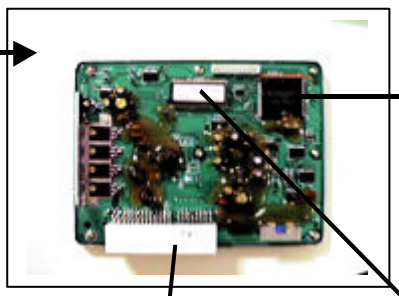
The injection system and ignition system operation are controlled by the Nippodenso ECU, code no. 265470 (not final!!!).

The control unit is connected to the rest of the bike's electrical system by two 'fast' connectors. As well as being fed with power and receiving signals from the sensors through these connectors, the control unit also controls the injectors and l.t. ignition coils and dialogues with the panel and, in addition, checks that the correct torque is transmitted to the wheels. The figure below gives a basic outline of these connections:

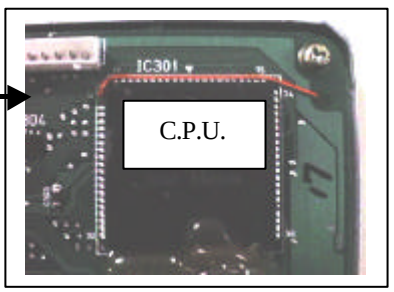


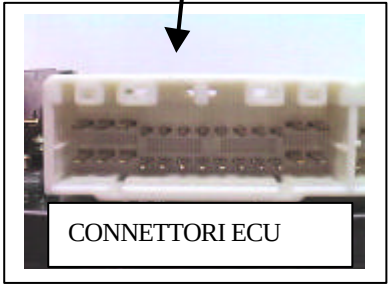
The ECU is governed by an 8 bit/8Mhz CPU which performs the logic and control functions. The calculation tables and algorithms are resident in the E-PROM.

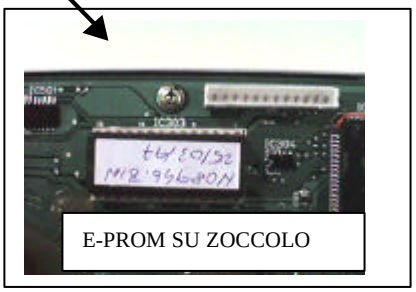
Centralina ECU



Centralina ECU: C.S.

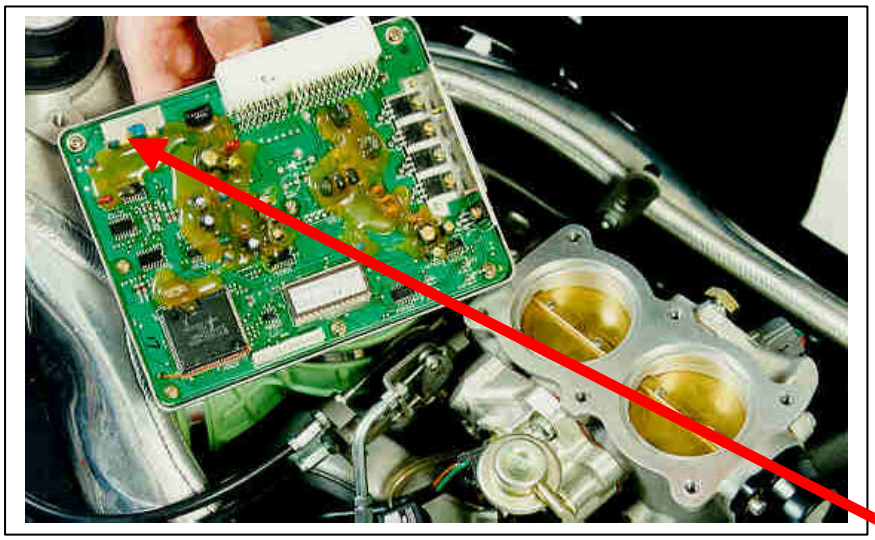


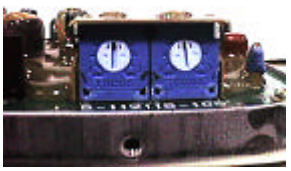




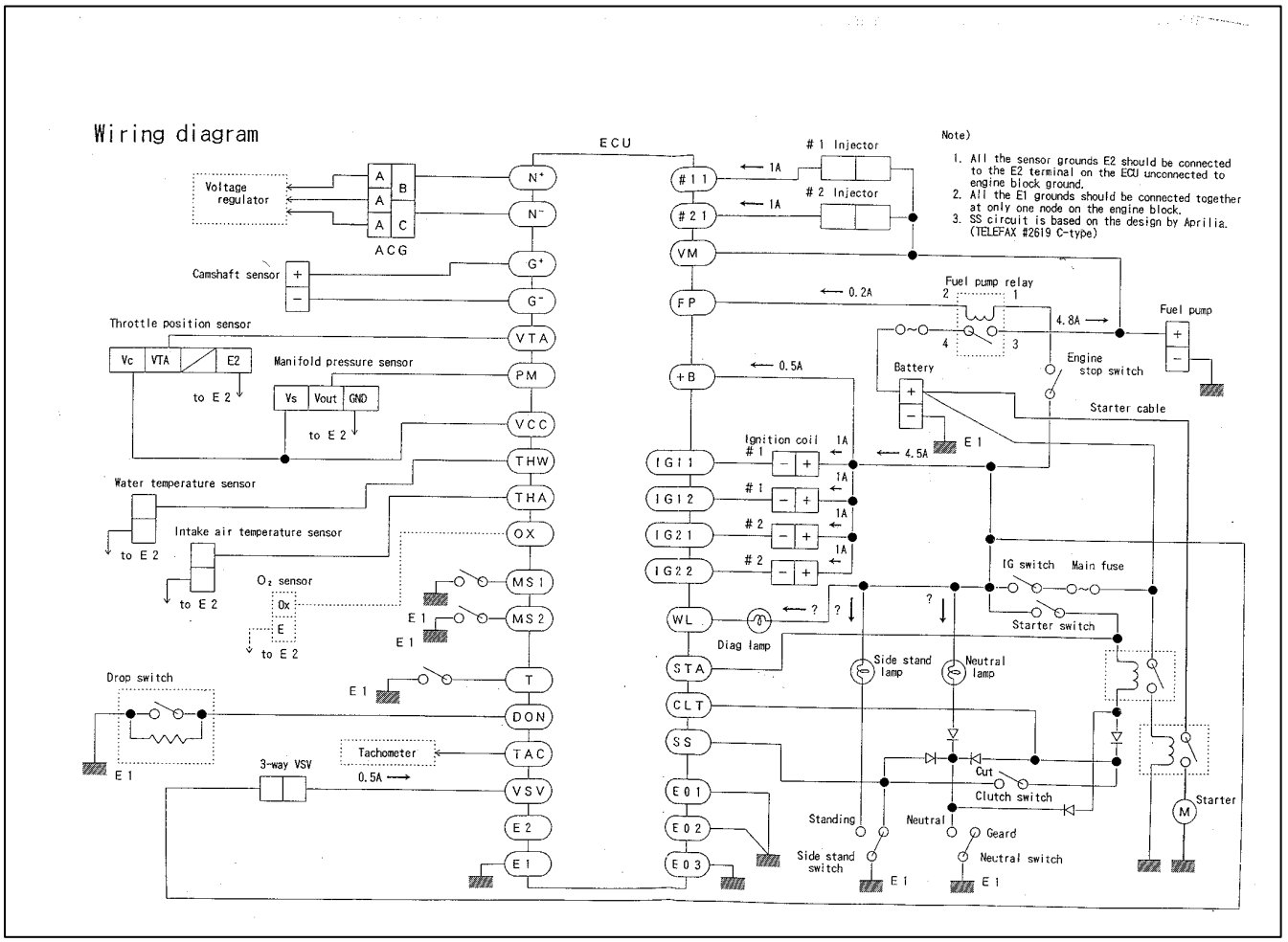
In addition, the following systems/components are inside the control unit:

- coils/injectors control power circuit
- Atmospheric pressure sensor
- CO regulation trimmer





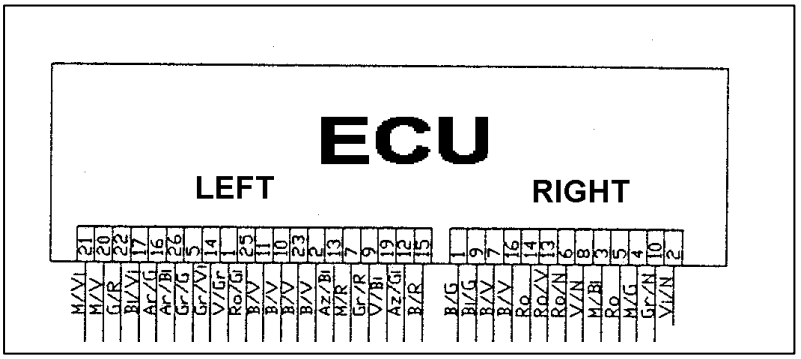
ECU ELECTRONIC WIRING DIAGRAM:



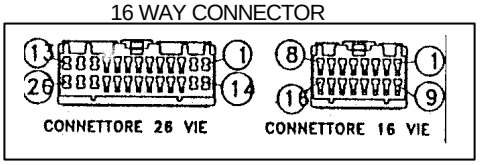
ONNECTORS:

The control unit is connected to the electrical circuit by plug-in connectors that plug into the ECU printed circuit.
The connectors connect the control unit to the sensors and actuators (injectors, coils) via the wiring.
Also, most of the connected components can be tested via the connectors, using any type of good quality ohmic tester.

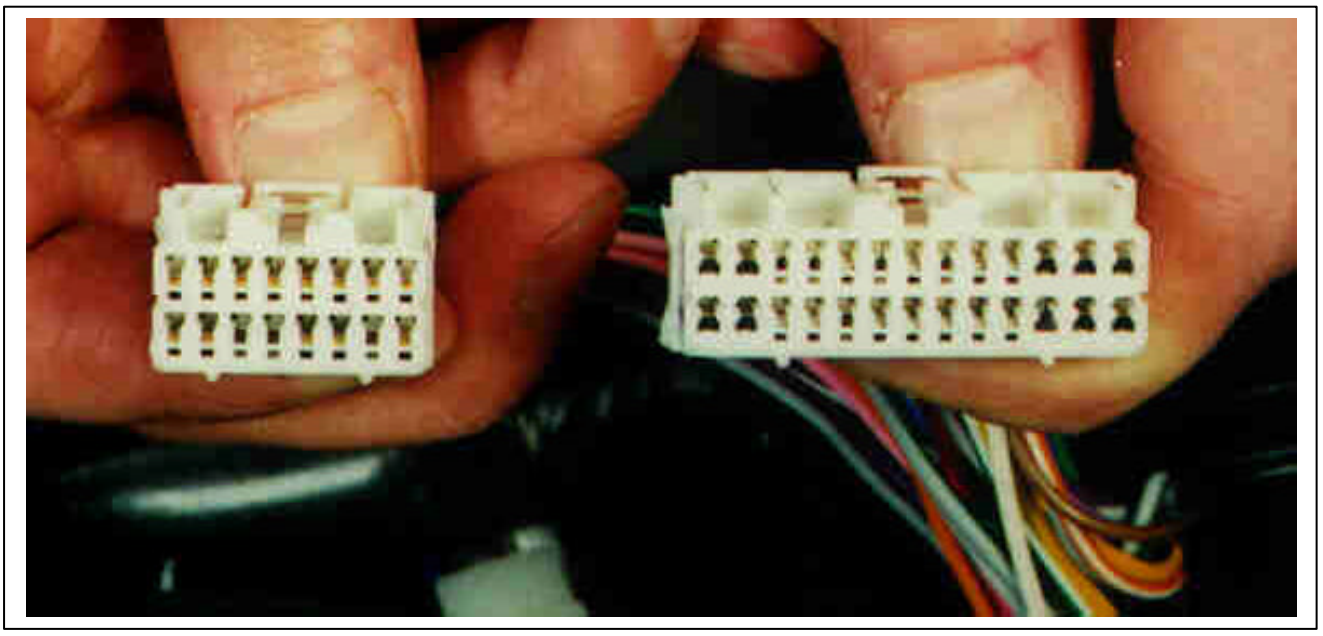
As detailed in the wiring diagram, the connectors refer to the specific components shown in the figure:



26 WAY CONNECTOR
16 WAY CONNECTOR

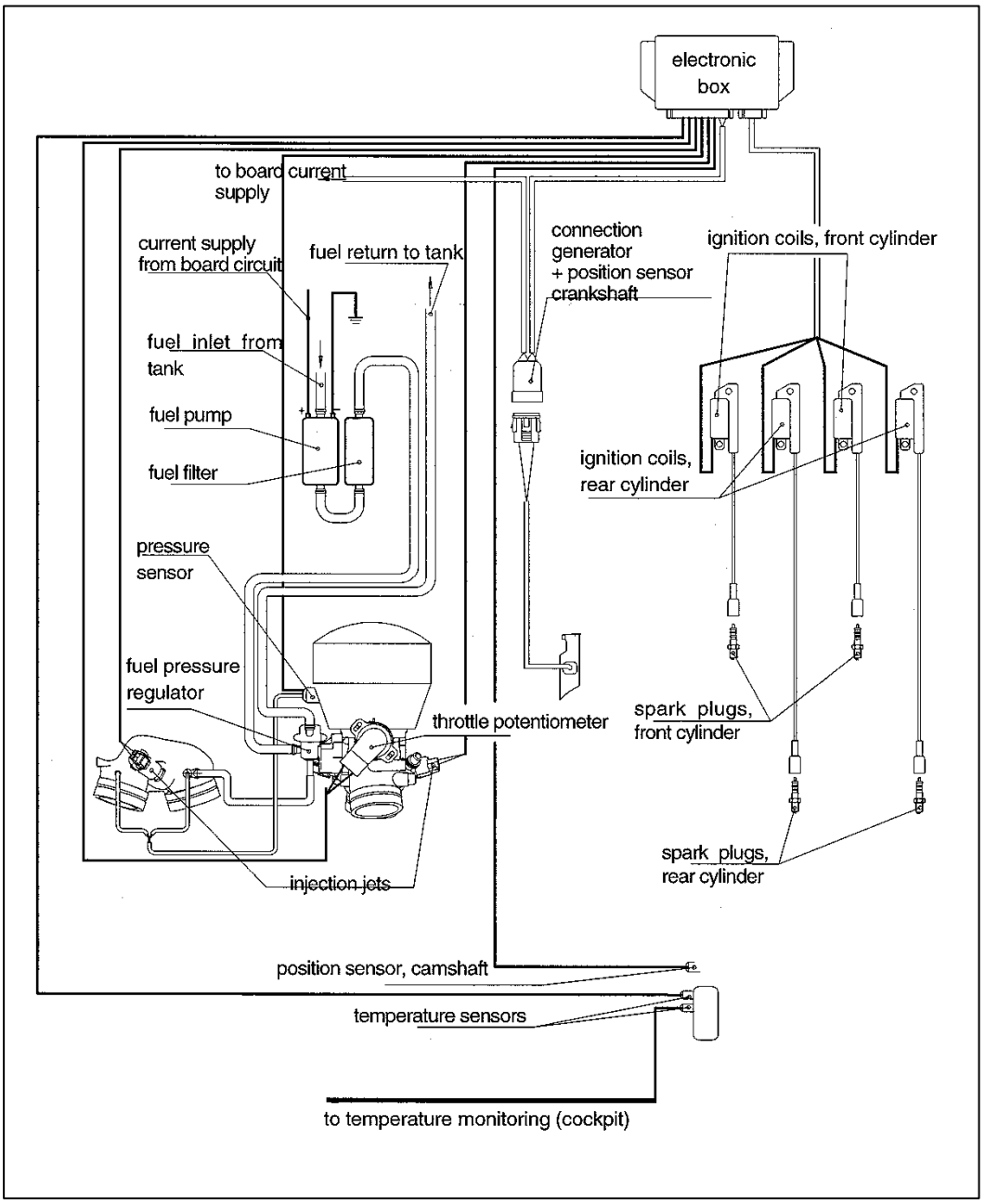


IDENTIFICAZIONE TERMINALI **ECU**



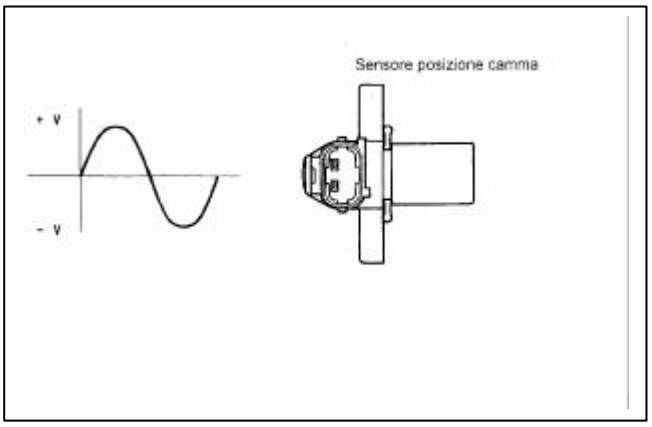
SECTION 4 POSITIONING OF SENSORS AND INJECTORS:

The position of each of the sensors is shown in the figure:



CAMSHAFT SENSOR:

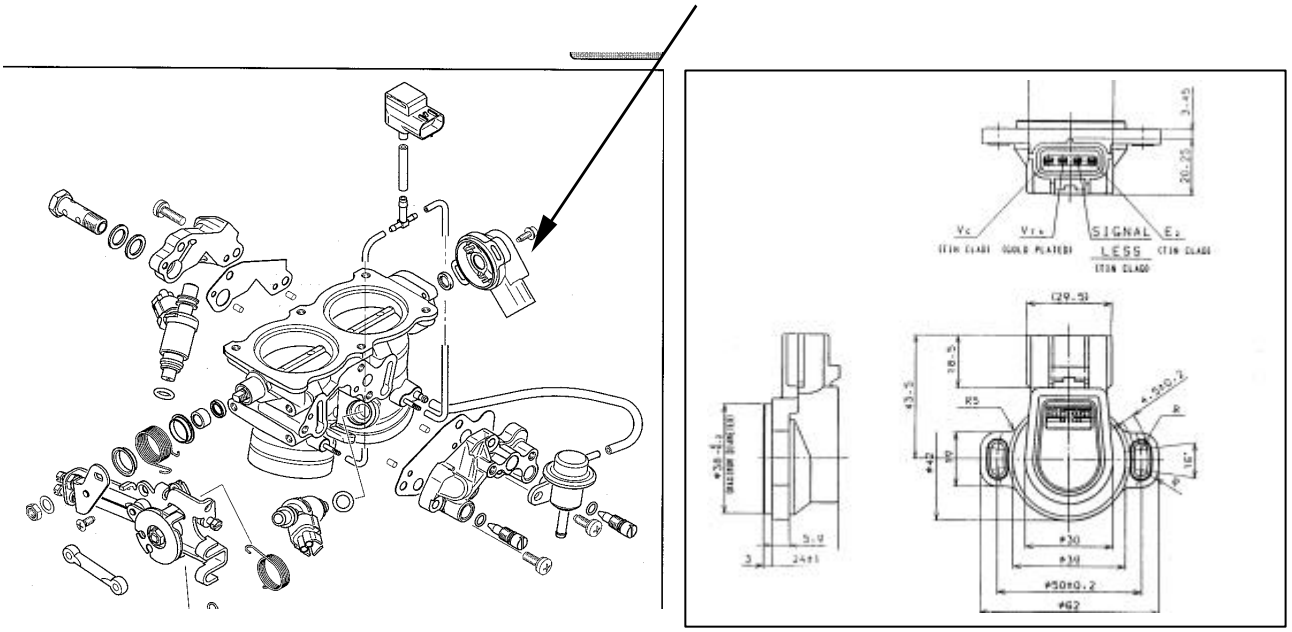
The cam sensor is an inductive sensor installed in the front cylinder head and is identical to the pick-up. This sensor is of fundamental importance and allows the ECU to recognise the exact sequence of each single cylinder, resetting the internal count to zero during the asynchronous ignition phase. The ohmic resistance of the sensor, measured at a temperature of 20 degrees, is about 240 Ohms. This resistance can be measured either directly on the sensor wiring or at the ECU connectors, connecting a tester between the terminals, as shown.



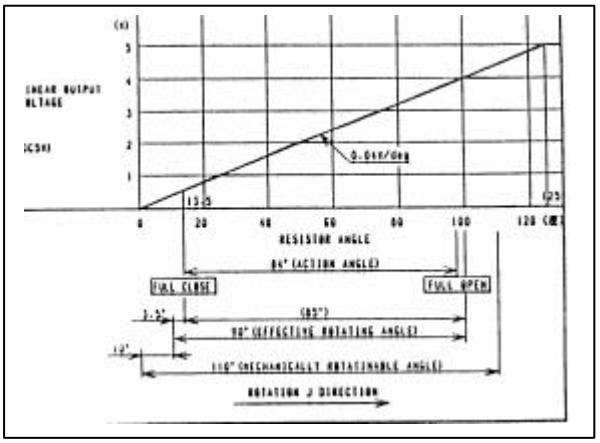
SW –ECU DIAGNOSIS	EXISTENT
OHMIC DIAGNOSIS	AVERAGE VALUE 240 Ohms
MEASURED BETWEEN WIRES	2-10 (PURPLE/BLACK and GREY/BLACK) RIGHT-HAND CONNECTOR

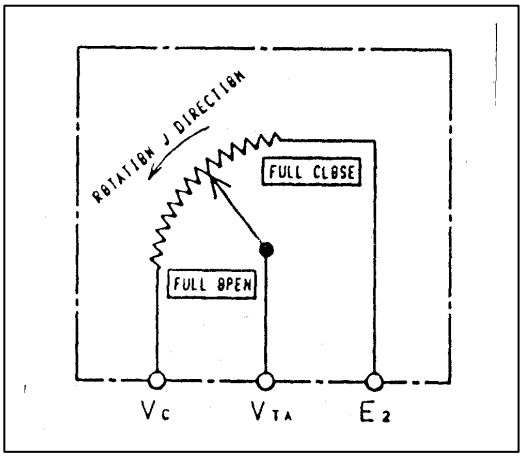
THROTTLE SENSOR:

The throttle sensor, a highly reliable potentiometer, is a 4-pin resistive sensor. The sensor sends a voltage signal, proportional to the opening angle of the throttle valve, to the control unit. The sensor is positioned in the throttle assembly, as shown in the figure.



The figure shows the sensor connections and the sensor resistance curve/angle.





SW –ECU DIAGNOSIS	EXISTENT
OHMIC DIAGNOSIS	AVERAGE VALUE 3500 OHM (ALPHA=0)
MEASURED BETWEEN WIRES	15 LH CONNECTORS: BLUE/RED 3 RH CONNECTORS: BROWN/WHITE 4 RH CONNS.: BROWN/YELLOW

CRANKSHAFT SENSOR: PICK - UP

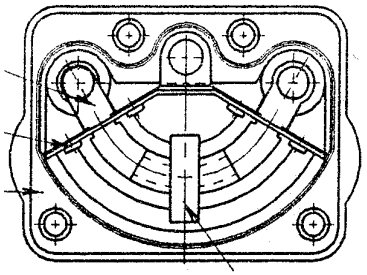
An inductive sensor, already familiar from other models, positioned inside the magneto flywheel. Sends a voltage pulse to the control unit for every 60° of rotation and is of fundamental importance, together with the camshaft pulse, in allowing the ECU to set the injection and ignition times.
The bike will stop if this sensor breaks (see START and RUN POSSIBILITY TABLE)

SW –ECU DIAGNOSIS	EXISTENT
OHMIC DIAGNOSIS	AVERAGE VALUE 240 Ohms
MEASURED BETWEEN WIRES	9-1 (WHITE/YELLOW AND BLUE/YELLOW) RIGHT-HAND CONNECTOR

TIP OVER SENSOR:

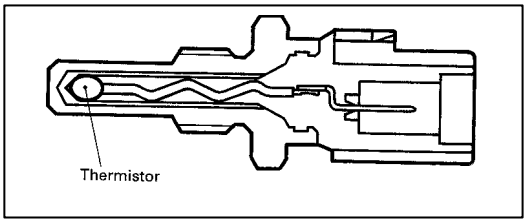
This is a mechanical ring-switch which stays in contact with the plastic section as long as the bike is in a normal position. When the bike leans, the ring moves and, if the angle is greater than 44 degrees, it activates the switch terminals.
A monitoring resistor is connected in parallel to the switch, for the control unit to check the connection to the component.

This new sensor is fitted on the battery box and reads the angle of the bike.
If the “lean” angle is greater than 44°, the switch is activated and - after a period of time set in the control unit SW - the injection, fuel feed and ignition systems are disabled.



SW –ECU DIAGNOSIS	EXISTENT
OHMIC DIAGNOSIS	OPEN CIRCUIT
MEASURED BETWEEN WIRES	7-14 (GROUND and RED) RIGHT-HAND CONNECTOR

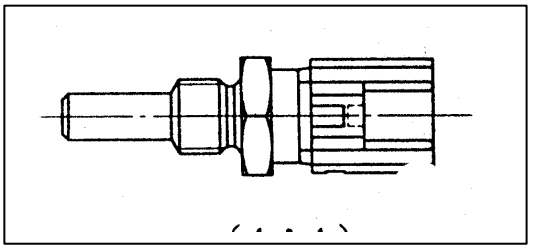
ENGINE COOLANT TEMPERATURE SENSOR:



This temperature sensor has a variable resistance which decreases with the increase in temperature.
The ECU provides the sensor with a +5 Volt signal and measures the corresponding current, thus calculating the temperature, based on the characteristics of the sensor.
Each of the cylinders has one of these sensors, although only one of them is connected to the ECU (the other is connected to the control panel).

SW –ECU DIAGNOSIS	EXISTENT
OHMIC DIAGNOSIS	AVERAGE VALUE(20C°) 2700 OHMS (DELTA CAN BE 300 OHM)
MEASURED BETWEEN WIRES	15 LH CONNECTORS :BLUE RED 6 RH CONNECTORS: RED/BLACK

AIR TEMPERATURE SENSOR:



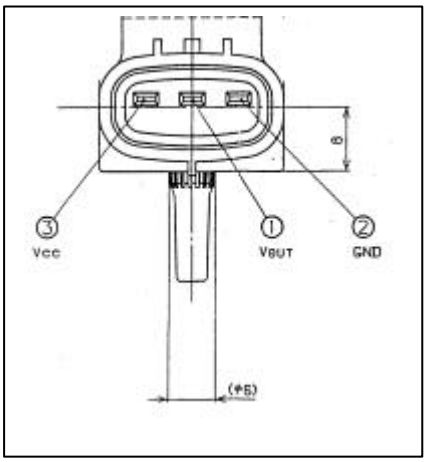
This temperature sensor has a variable resistance which decreases with the increase in temperature.
The ECU provides the sensor with a +5 Volt signal and measures the corresponding current, thus calculating the temperature, based on the characteristics of the sensor.

SW –ECU DIAGNOSIS	EXISTENT
OHMIC DIAGNOSIS	AVERAGE VALUE (20C°) 2700 OHMS (DELTA CAN BE 300 OHM)
MEASURED BETWEEN WIRES	15 LH CONNECTORS :BLUE RED 13 RH CONNECTORS: **RED**/GREEN

MANIFOLD PRESSURE SENSOR:

This sensor reads the pressure in the air cleaner box and provides a linear voltage in the range of 1 to 4.2 Volts to the control unit. It must be supplied with a continuous voltage of +5 Volts (provided by the control unit). The operating pressure ranges from13.3 to 120 Kpa (abs).
The characteristic of the sensor is:

Vo=Vcc*(0.006*Pi+0.12) [Volts]



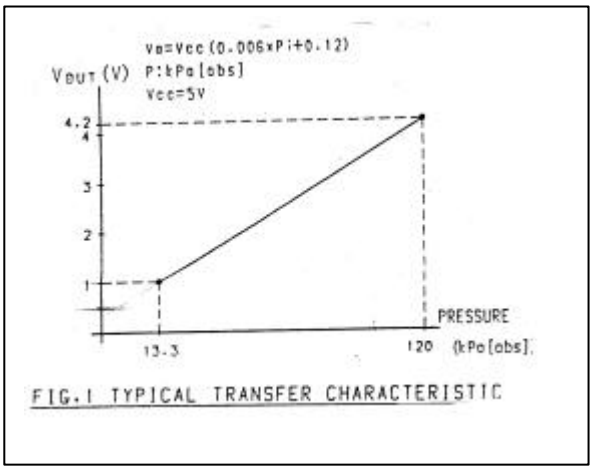
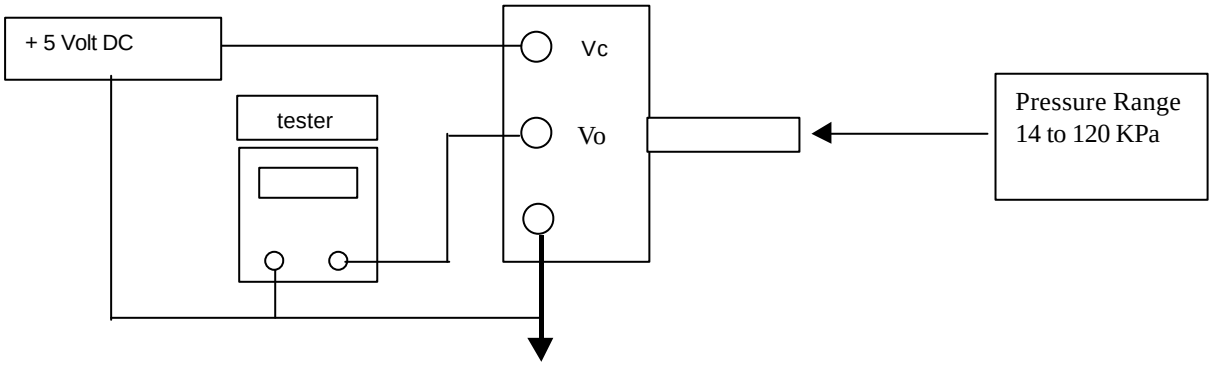


FIG.1 TYPICAL TRANSFER CHARACTERISTIC

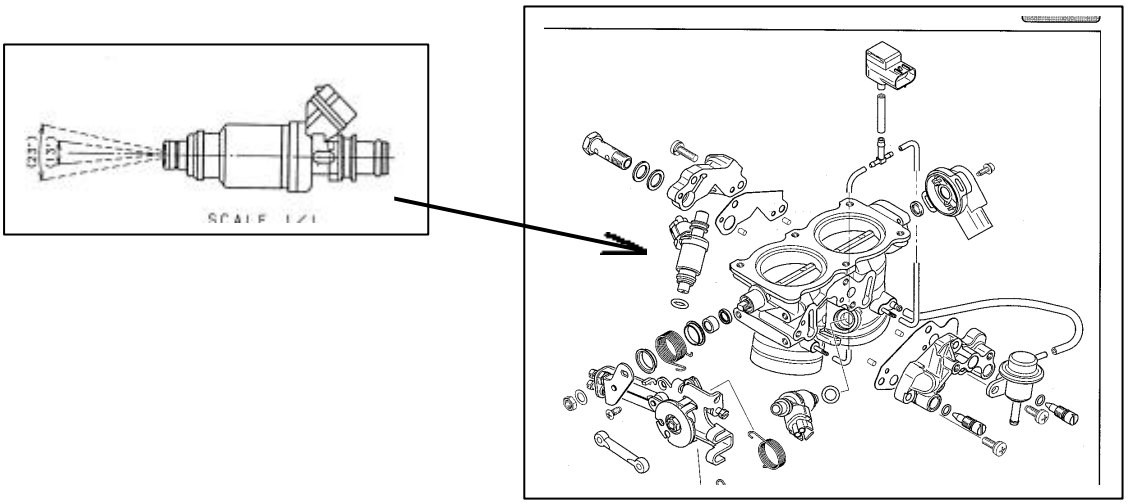
The figure shows the instrumental test phase for the sensor in question:



GND

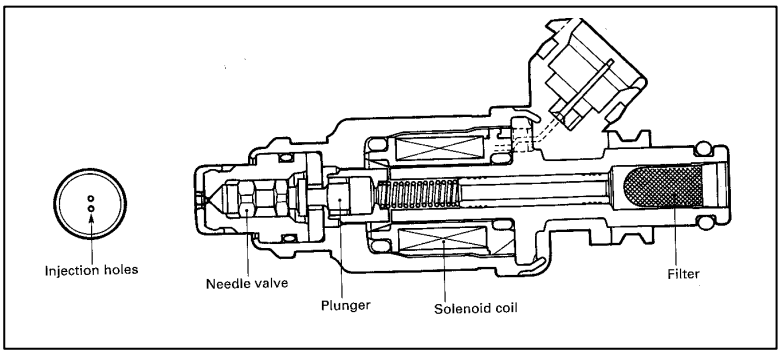
INJECTORS:

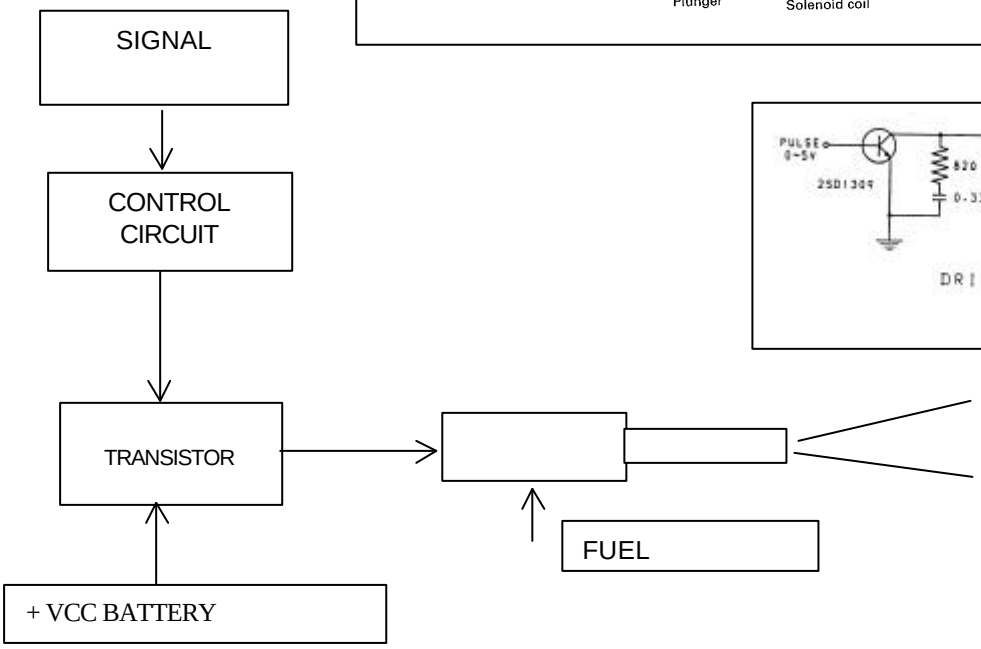
Each cylinder has an injector. The location in the throttle assembly is shown in the figure:



The injector used is made up of the following components:

1. Mesh filter
2. Compression spring
3. Valve shaft
4. Injector coil
5. Injector jet

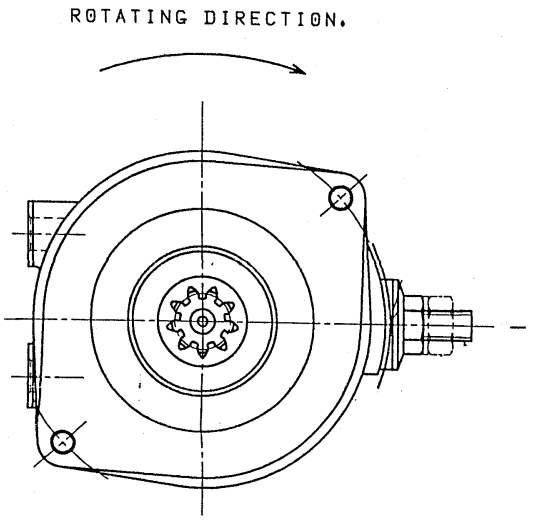


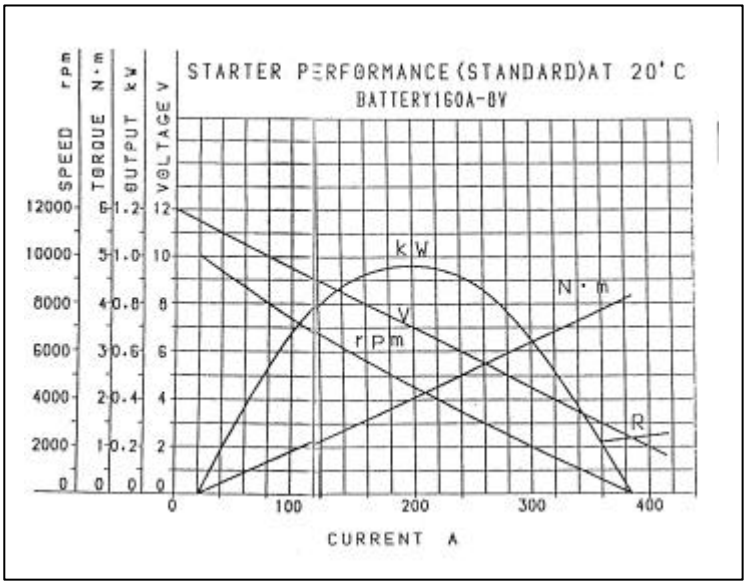


OTHER RELEVANT ELECTRICAL COMPONENTS:

STARTER MOTOR:

The characteristic operating curves are shown below:

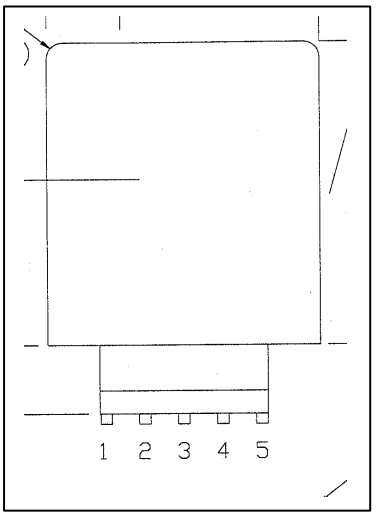


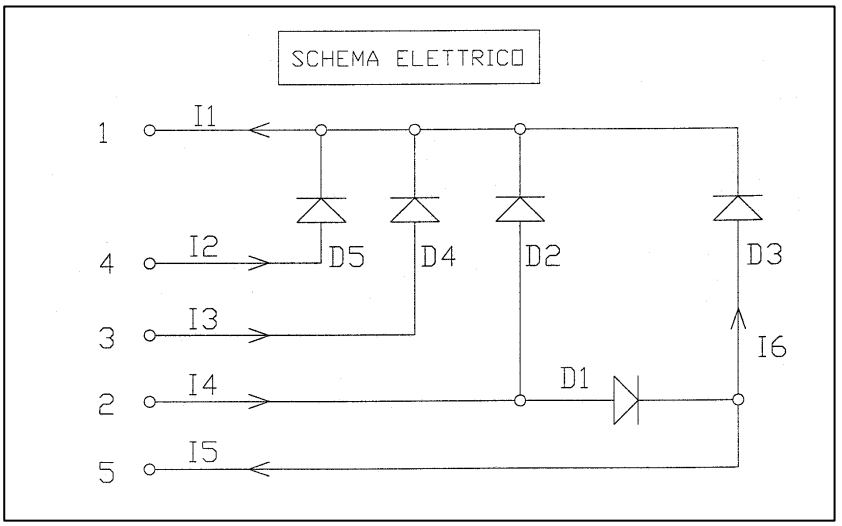


DIODE MODULE:

The figure shows the electrical wiring in the module. The continuity of the diodes can be checked with a tester or with a 4.5 - 12 Volt battery with an arbitrary load of max. 2 Watts.

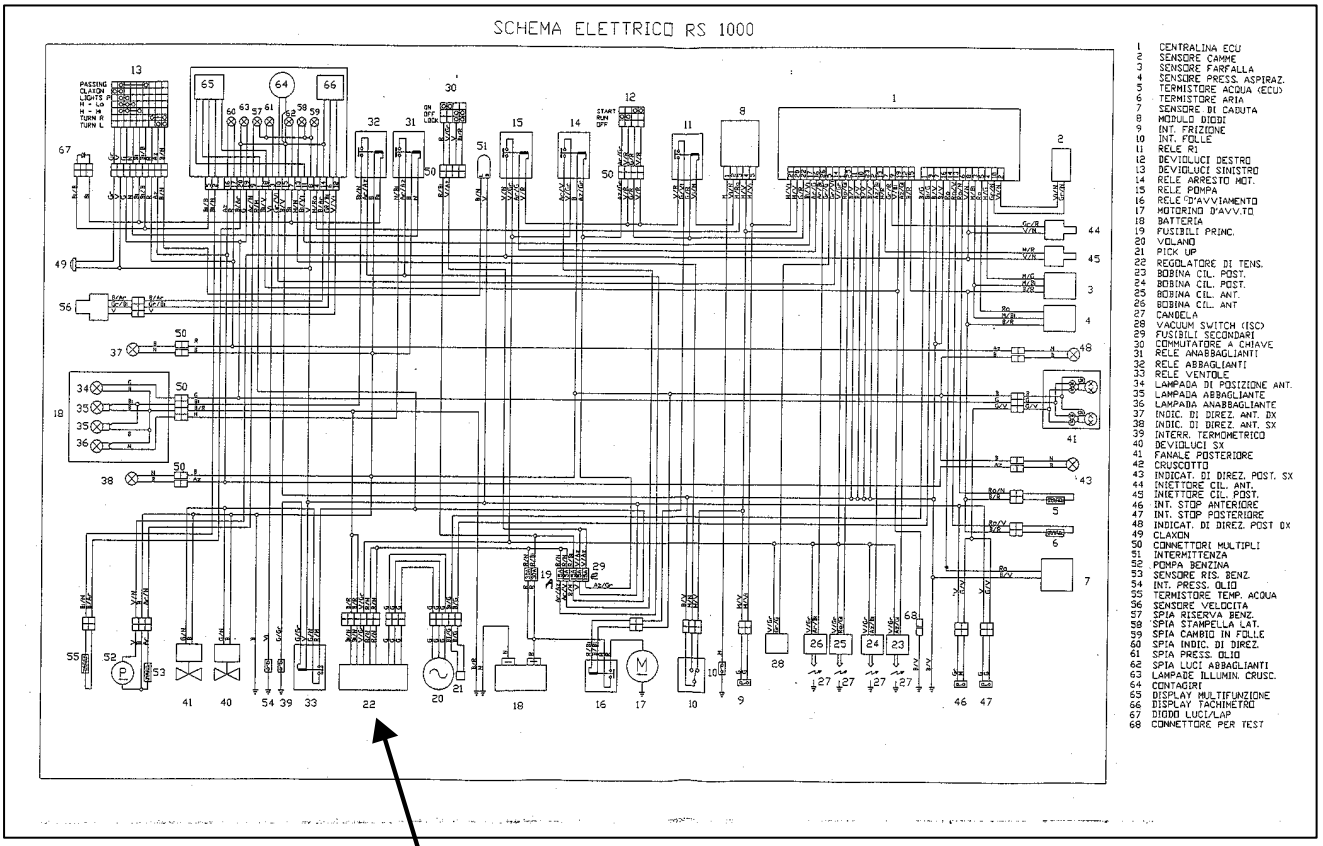
Remember that the diode conducts the current one way only, as indicated by the arrow representing the component in the diagram.

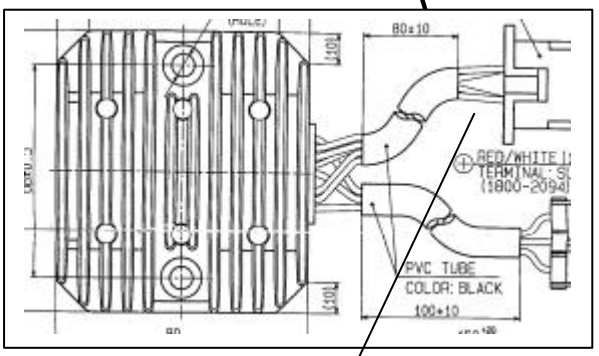


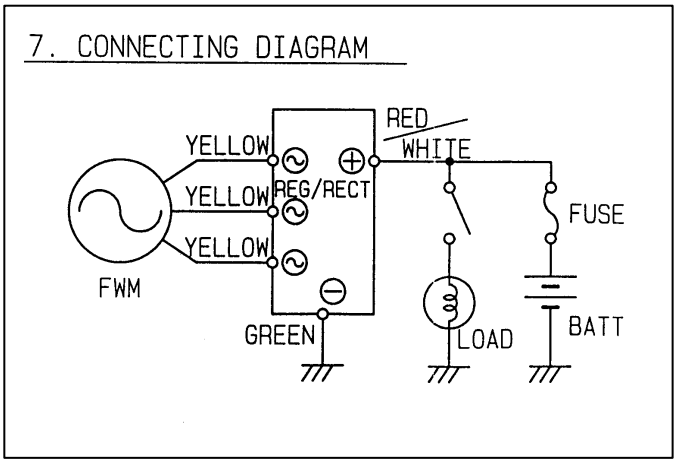


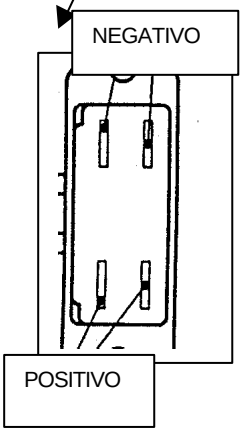
VOLTAGE REGULATOR:

The voltage regulator is situated at the rear of the bike on the right, in contact with the bodywork.









TRASLATION OF LEGENDA FOR
RS 1000 ELECTRIC WIRING DIAGRAM

1 ECU
2 CAMSHAFT SENSOR
3 THROTTLE SENSOR
4 INTAKE AIR PRESSURE SENSOR
5 WATER THERMISTOR (ECU)
6 AIR THERMISTOR
7 TIP OVER SENSOR
8 DIODE MODULE
9 CLUTCH SWITCH
10 NEUTRAL SWITCH
11 RELAY R1
12 RIGHT MAIN/DIPPED BEAM SELECTOR
13 LEFT MAIN/DIPPED BEAM SELECTOR
14 ENGINE STOP RELAY
15 PUMP RELAY
16 STARTER RELAY
17 STARTER MOTOR
18 BATTERY
19 MAIN FUSES
20 FLYWHEEL
21 PICK UP
22 VOLTAGE REGULATOR
23 REAR CYL. COIL
24 REAR CYL. COIL
25 FRONT CYL. COIL
26 FRONT CYL. COIL
27 SPARK PLUG
28 VACUUM SWITCH (ISC)
29 SECONDARY FUSES
30 KEY SWITCH
31 DIPPED BEAM RELAY
32 MAIN BEAM RELAY
33 FANS RELAY
34 FRONT SIDE LIGHT
35 MAIN BEAM LIGHT
36 DIPPED BEAM LIGHT
37 FRONT RH DIRECTION INDICATOR
38 FRONT LH DIRECTION INDICATOR
39 THERMOMETER SWITCH
40 LH MAIN/DIPPED BEAM SELECTOR
41 TAILLIGHT
42 DASHBOARD
43 REAR LH DIRECTION INDICATOR
44 FRONT CYL. INJECTOR
45 REAR CYL. INJECTOR
46 FRONT BRAKE BRAKE LIGHT SWITCH
47 REAR BRAKE BRAKE LIGHT SWITCH
48 REAR RH DIRECTION INDICATOR
49 HORN
50 MULTIPLE CONNECTORS
51 FLASHER
52 FUEL PUMP
53 FUEL WARNING LIGHT SENSOR
54 OIL PRESSURE SWITCH
55 WATER TEMP. THERMISTOR
56 SPEED SENSOR
57 FUEL WARNING LIGHT
58 SIDE STAND WARNING LIGHT
59 NEUTRAL GEAR WARNING LIGHT
60 DIRECTION INDICATOR WARNING LIGHT
61 OIL PRESSURE WARNING LIGHT
62 MAIN BEAM WARNING LIGHT
63 DASHBOARD LIGHT
64 REV COUNTER
65 MULTIFUNCTION DISPLAY
66 SPEEDOMETER DISPLAY
67 LIGHTS/LAP DIODE
68 TEST CONNECTOR

3.2 FUEL CIRCUIT

The fuel circuit is made up of the following components:

1 fuel pump
2 fuel feed pipe
3 pressure regulator
4 injector.

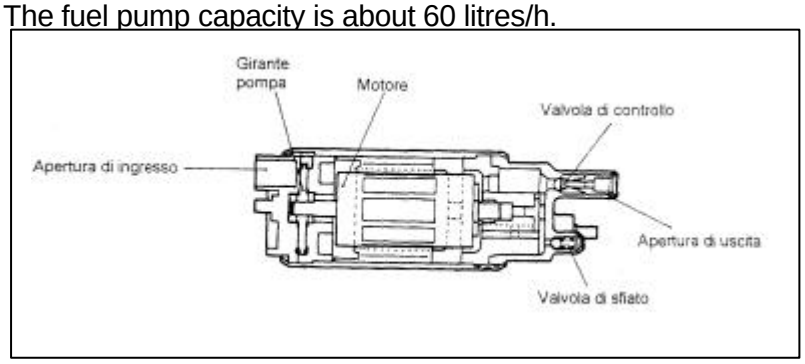
The fuel pump is immersed in the fuel tank and pumps the pressurised fuel to the feed pipe, where the pressure regulator keeps the fuel pressure about 3 bars higher than the intake pressure. The excess pressure is “vented” by the regulator and the excess fuel goes back to the tank through the return hose. The regulator is controlled by the inlet manifold average pressure. The pressure on the injector is thus compensated by the intake ducts pressure.

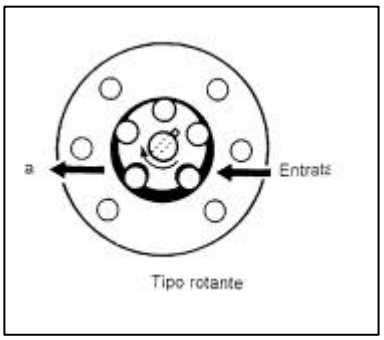
The fuel pump is the WESCO type. The functions of the pump are as follows:

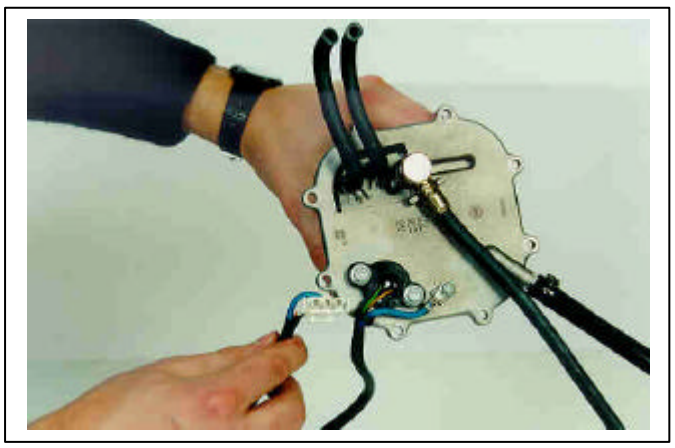
1. Pressurise the fuel in the fuel feed circuit
2. Relief valve for p> 5-6 atm
3. Check valve to maintain the pressure in the circuit when the engine is turned off

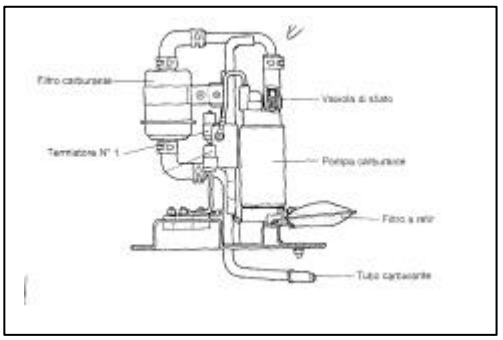
There is a mesh filter at the pump inlet port; after filtering, the fuel is sent to the impeller-type pump chamber (see fig.).

The fuel pump capacity is about 60 litres/h.

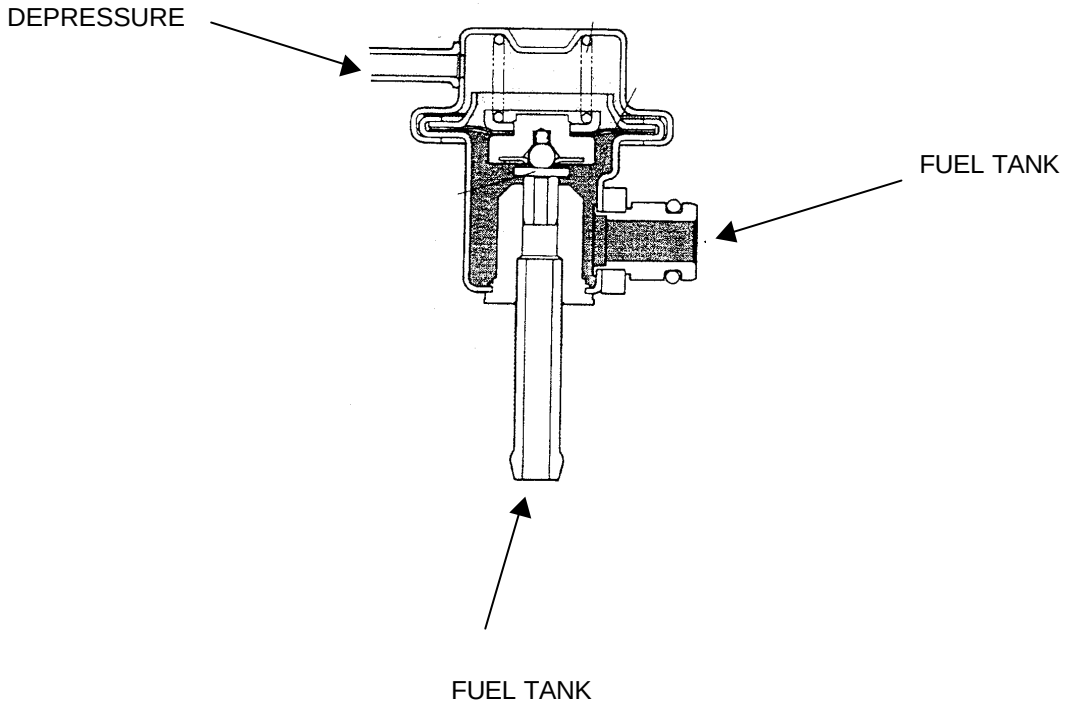




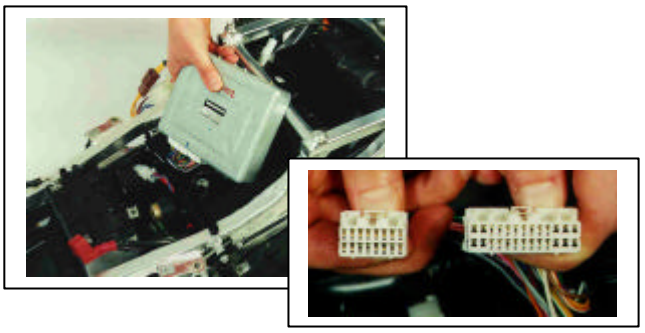


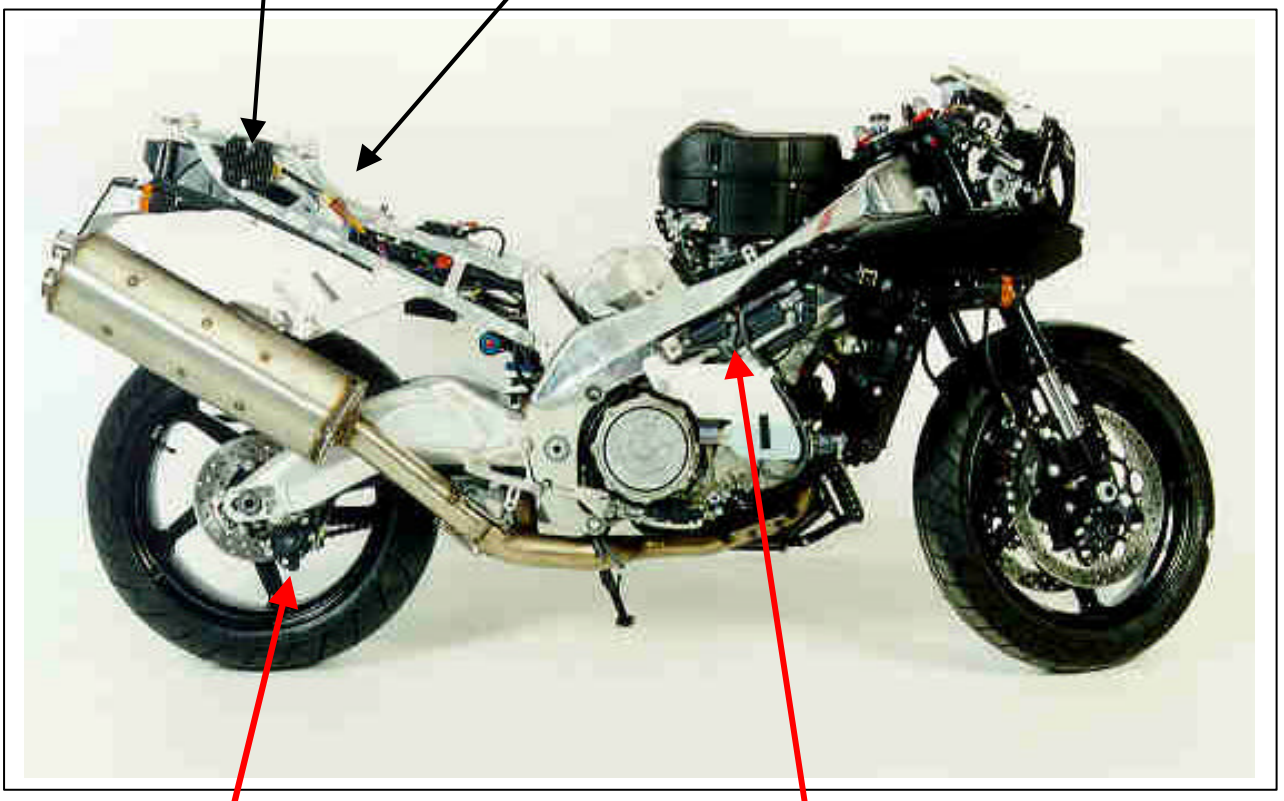


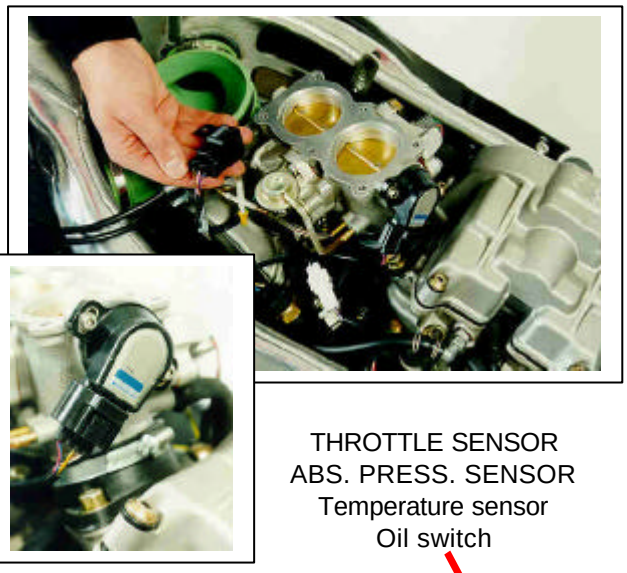
The regulator - shown in the figure - has the following components: a vacuum-operated diaphragm and spring, and a steel ball valve with the valve seat mounted on the spring.



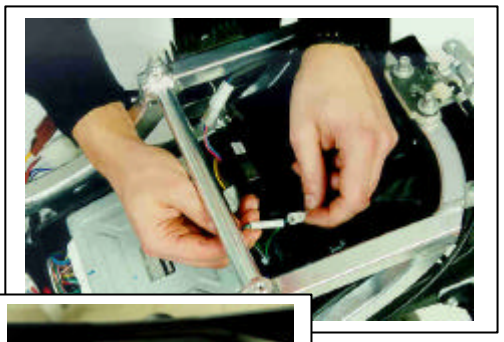
POSITIONING OF ELECTRICAL COMPONENTS ON BIKE:

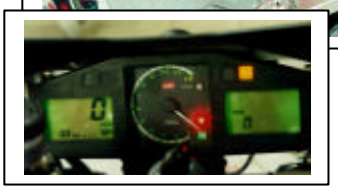




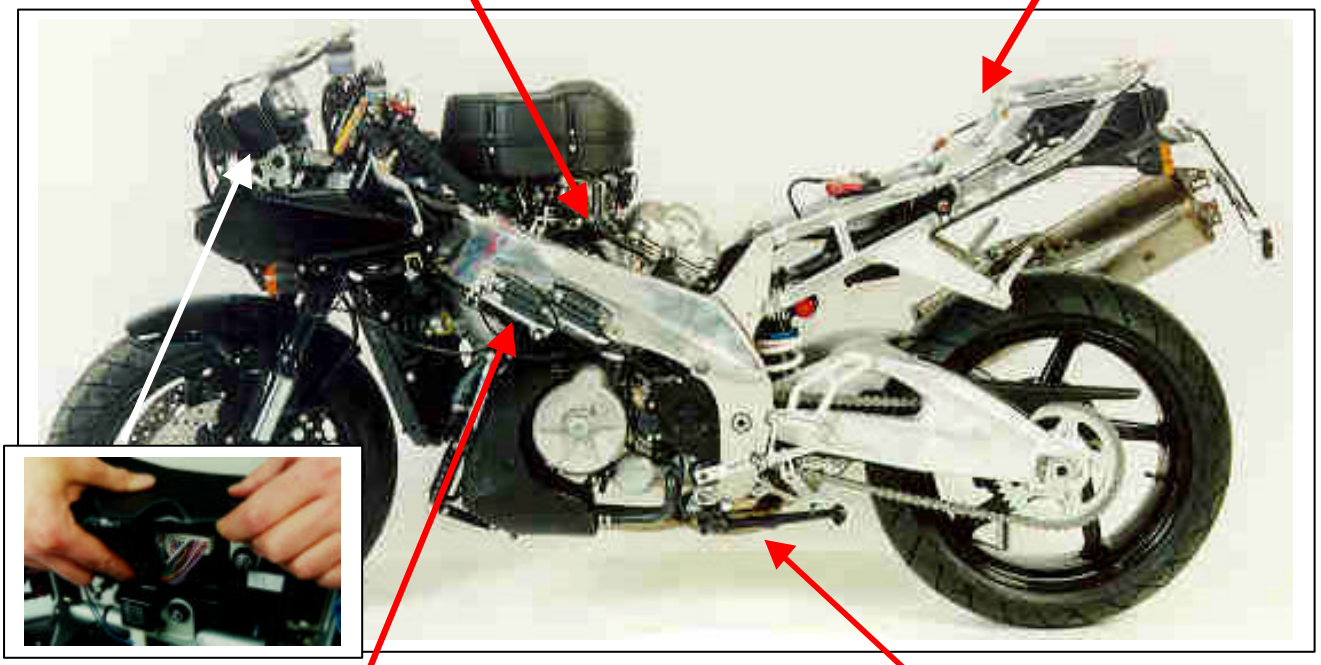


THROTTLE SENSOR
ABS. PRESS. SENSOR
Temperature sensor
Oil switch





DIODE UNIT
POWER RELAY
DIAG CONNECTOR



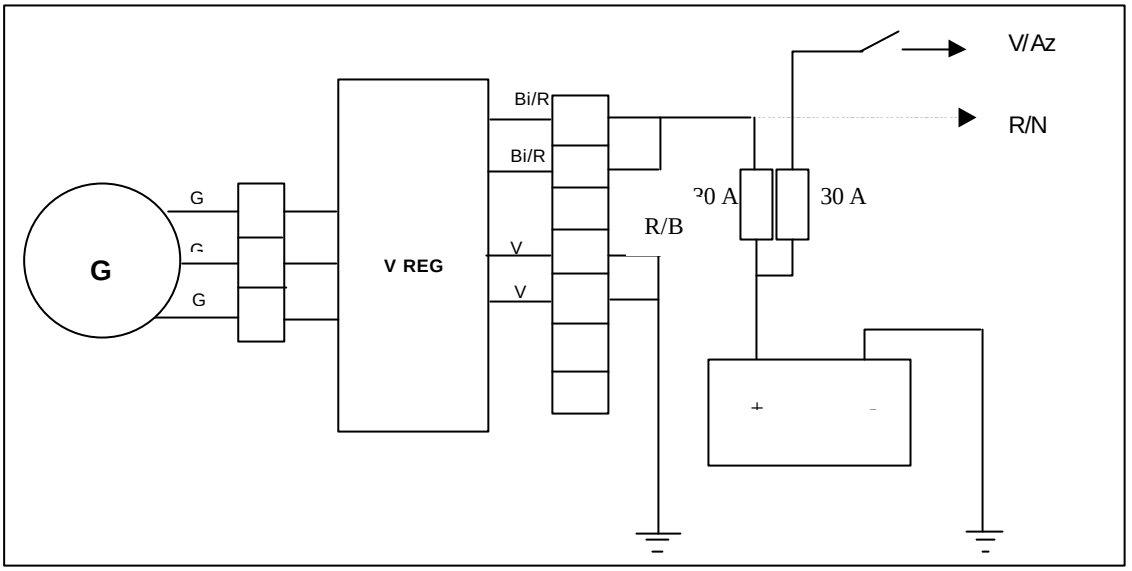
COIL

STAND SWITCH

SECTION 5: ELECTRICAL CHECKS

Refer to the key below when consulting this chapter:

Ar= orange
Az= light blue
B= blue
Bi= white
G= yellow
Gr= grey
M= brown
N= black
R= red
R= pink
V= green
Vi= purple



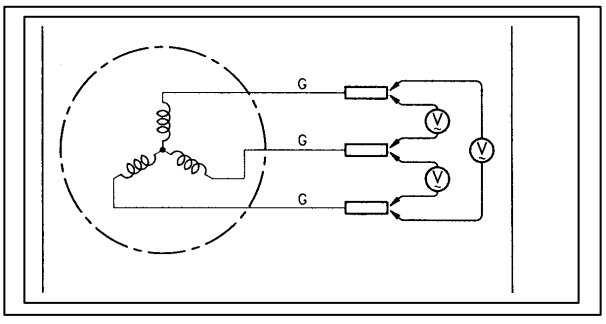
CHECK 1. RECHARGE VOLTAGE TEST

Check the electrolyte level
Check the battery voltage
Start the engine and take it up to 4000 rpm
Switch the light switch to dipped beam
test the DC voltage between the battery terminals with a tester
STANDARD VOLTAGE: 13 – 15 VOLTS

CHECK 2. ALTERNATOR CHECK

Disconnect the brown connector from the regulator
Start the engine and take it up to 4000 rpm
The voltage, measured as shown in the figure, must be not less 60 Volts

The standard resistance of the generator coil is 0.1 – 1 Ohms.
Between cables and ground: infinite



CHECK 3: H.T. COIL CHECK:

Use the tester in the Ohms scale to check the continuity of the windings. The approx. values are as follows:

L.T. SIDE: 3-6 OHMS
H.T. SIDE: 12 – 15 KOHMS

Note: This method is NOT able to detect partial failures in the isolation

CHECK 4: TIP OVER SENSOR CHECK:

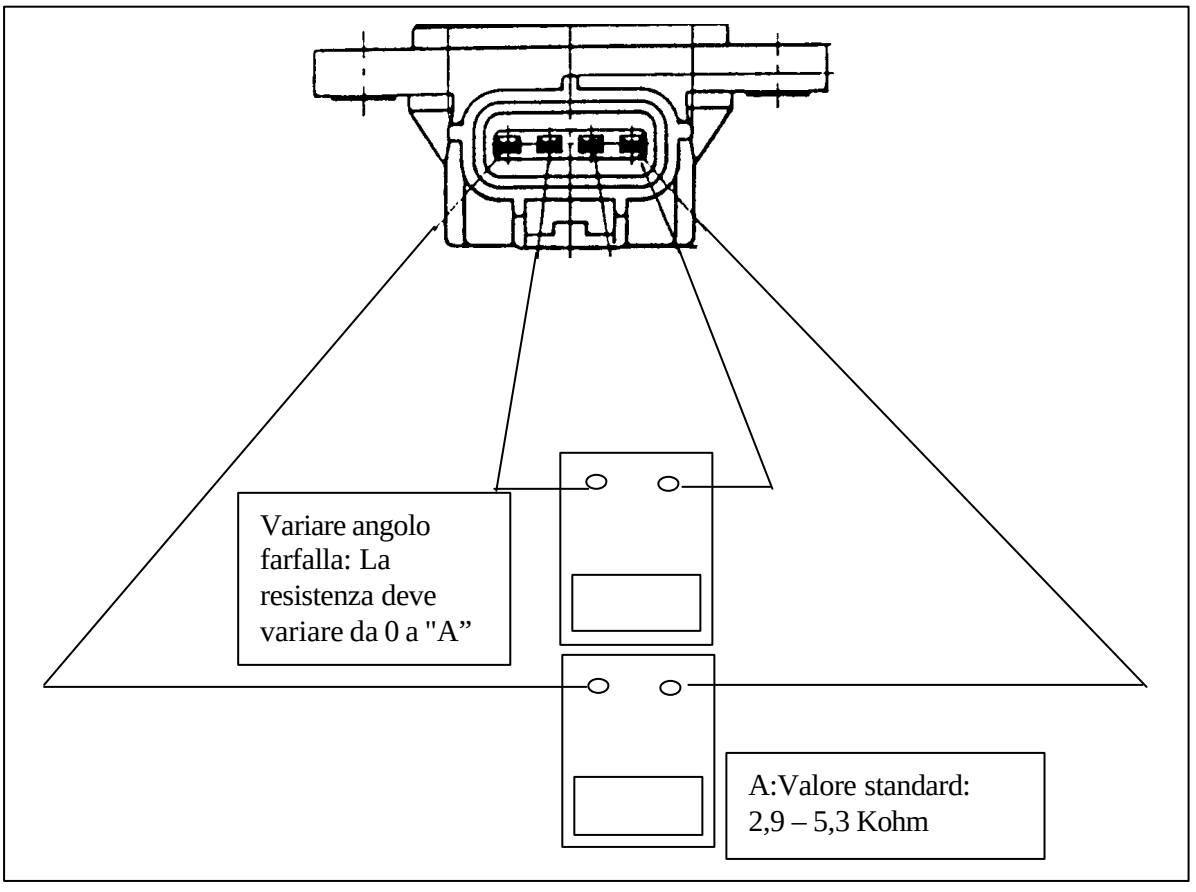
Remove the sensor plus grommet from its housing and tilt it sideways at an angle greater than 45° to simulate a fall.
The standard reading must be 0-1 Ohms.

CHECK 5: THERMISTOR CHECK:

Check the sensor resistance, using the tester in the Ohms scale.
At 20 degrees centigrade the resistance must be about 2450 Ohms
At 40 degrees centigrade the resistance must be about 1114 Ohms
At 60 degrees centigrade the resistance must be about 584 Ohms
At 90 degrees centigrade the resistance must be about 245 Ohms

CHECK 6: THROTTLE SENSOR CHECK:

With the sensor installed, check as shown in the figure (with the throttle in any position)



Fitting the throttle sensor:

(Please see section 9 for CO regulation)
With the engine off, turn the ignition key to ON.
When positioned in the throttle body, enable the control unit diagnostics function.
If there are no errors (i.e. sensors all OK) one of three possible numbers will appear:

+1: initial angle reading too high

0: throttle position OK

-1: initial angle reading too low

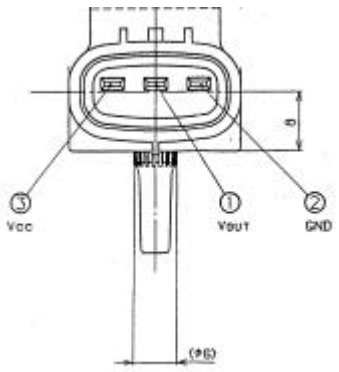
Turn the sensor until the 0 appears.

Fix the sensor in position.

Next, proceed with making the fine air setting on the injectors to balance the idling rate

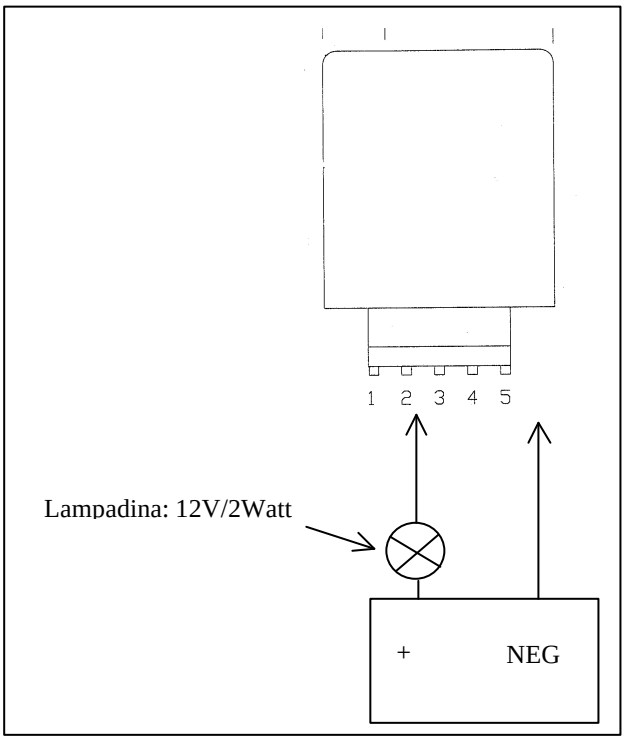
CHECK 7: PRESSURE SENSOR CHECK:

The readings below, taken one by one, must give a value of 15 kOhms
Ohmmeter between 1-3
Ohmmeter between1-2



CHECK 8: DIODE MODULE CHECK:

Disconnect the connector from the diode module and apply the circuit described below to the different terminals, as listed in the table:



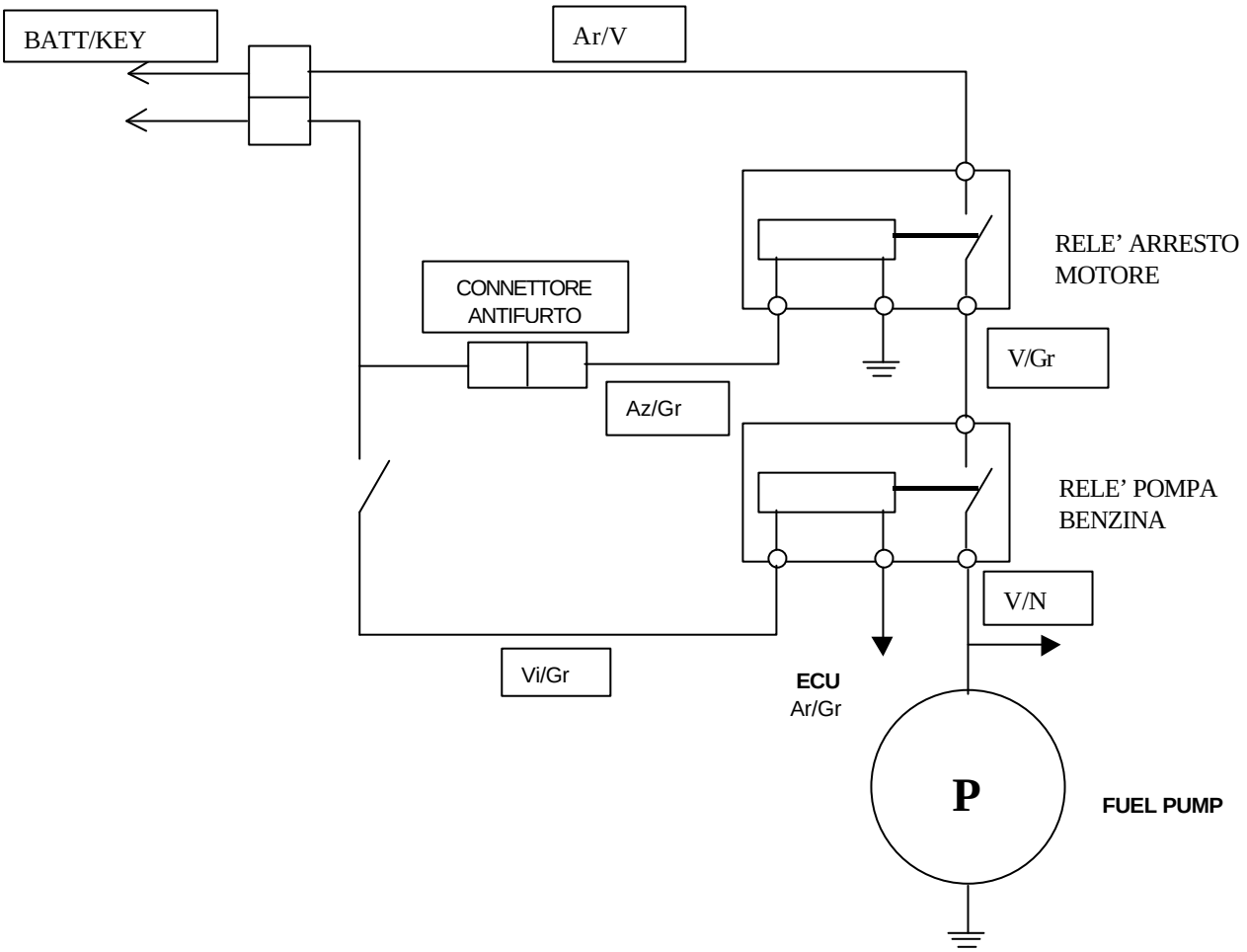
The switching-on order must be as shown in the table:

- \ +	1	2	3	4	5
1	X	On	On	On	On
2		X			
3			X		
4				X	
5		On			X

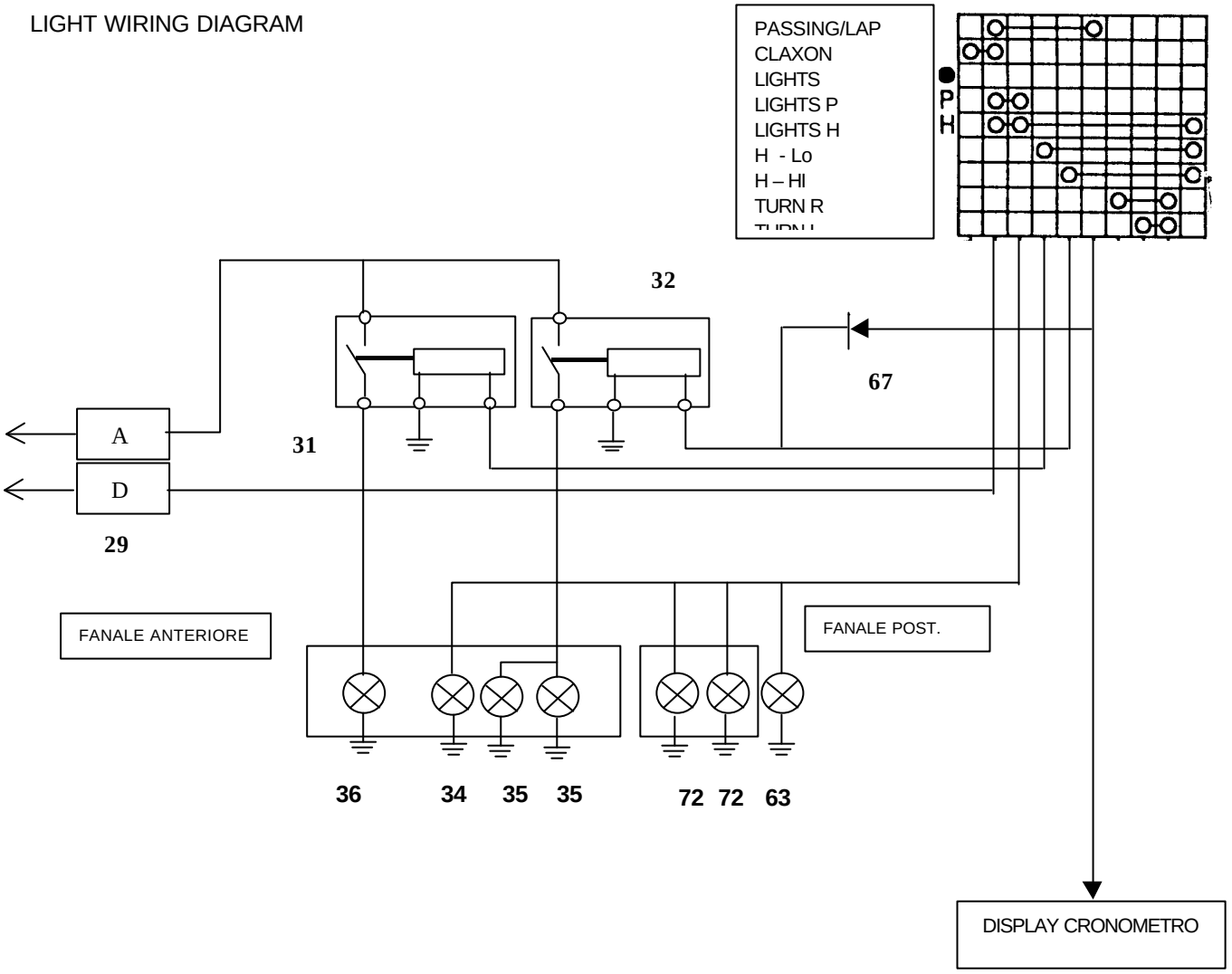
CHECK 9: FUEL PUMP CHECK:

Lift the fuel tank
Disconnect the pump assembly 3 way connector
Feed the green (+) and blue (-) wires coming from the side of the pump assembly with 12 Vdc.
Ensure that the pump works by giving a buzz and checking that the fuel comes out of the throttle assembly (disconnect the tube).

FUEL PUMP WIRING DIAGRAM



LIGHT WIRING DIAGRAM

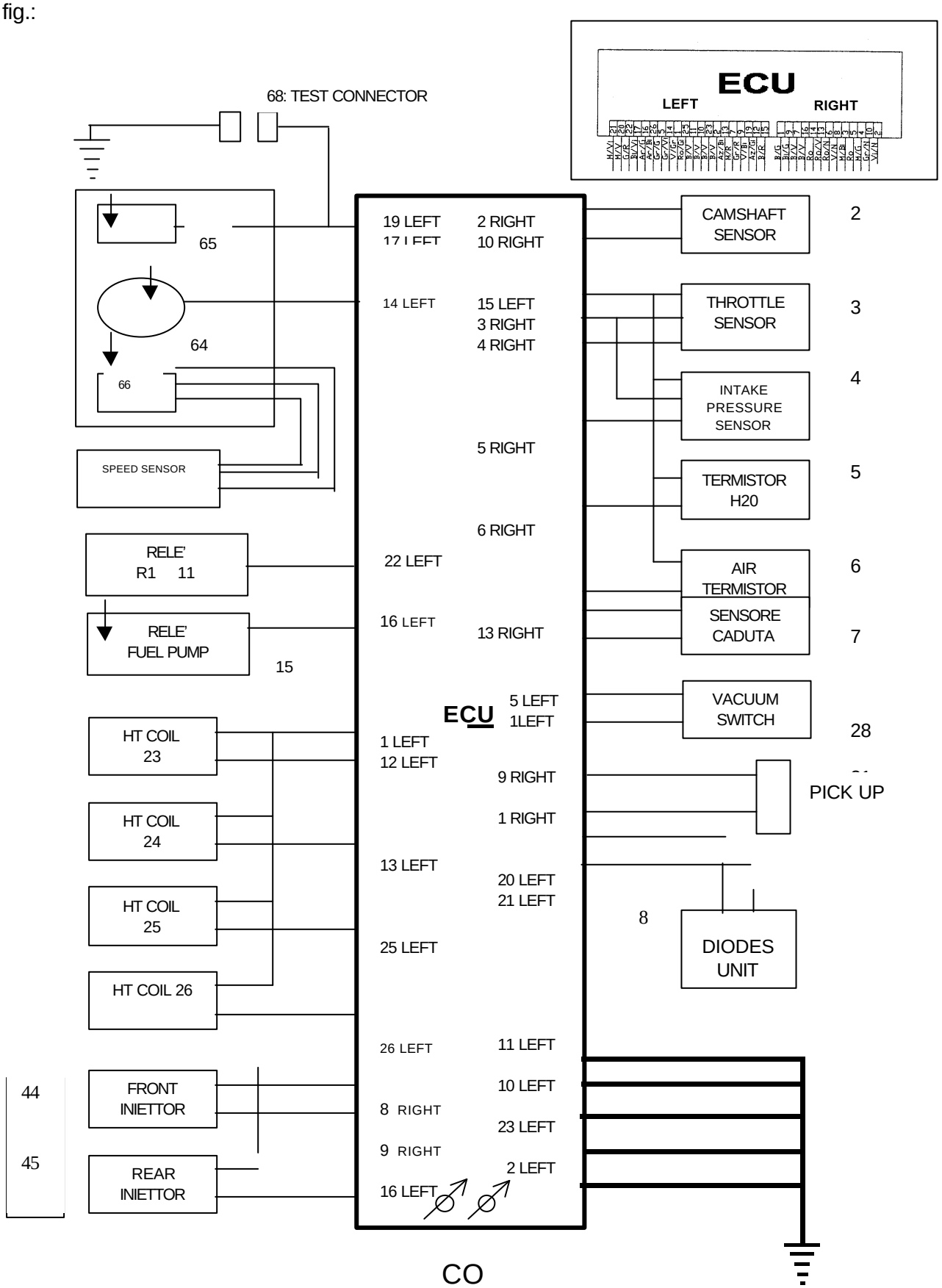


LEGENDA:

29= SECONDARY FUSES
31= MAIN BEAM LIGHTS RELAY
32= DIPPED BEAM LIGHTS RELAY
34= FRONT SIDE LIGHTS
35= MAIN BEAM LIGHTS
36= DIPPED BEAM LIGHTS
37= TAILLIGHT
63= DASHBOARD LIGHTS
67= PASSING/LAP DIODE
D= 15 AMP FUSE

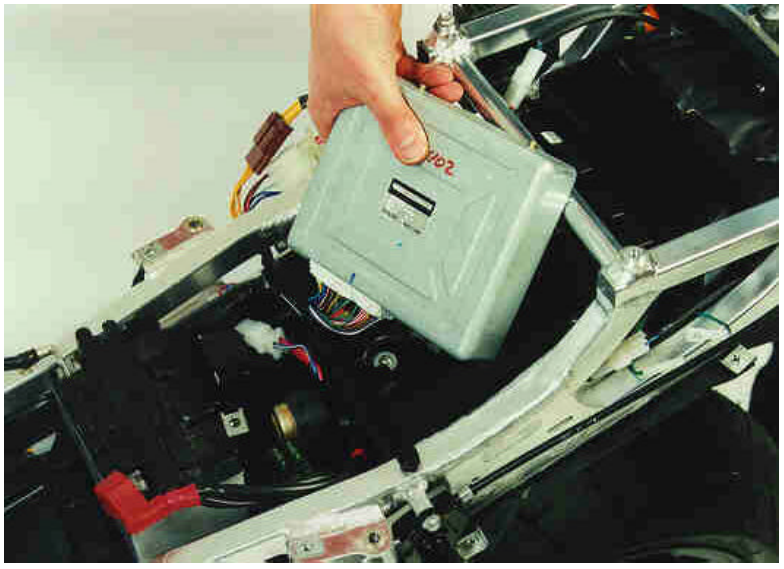
CHECK 10: WIRING AND COMPONENTS CHECK

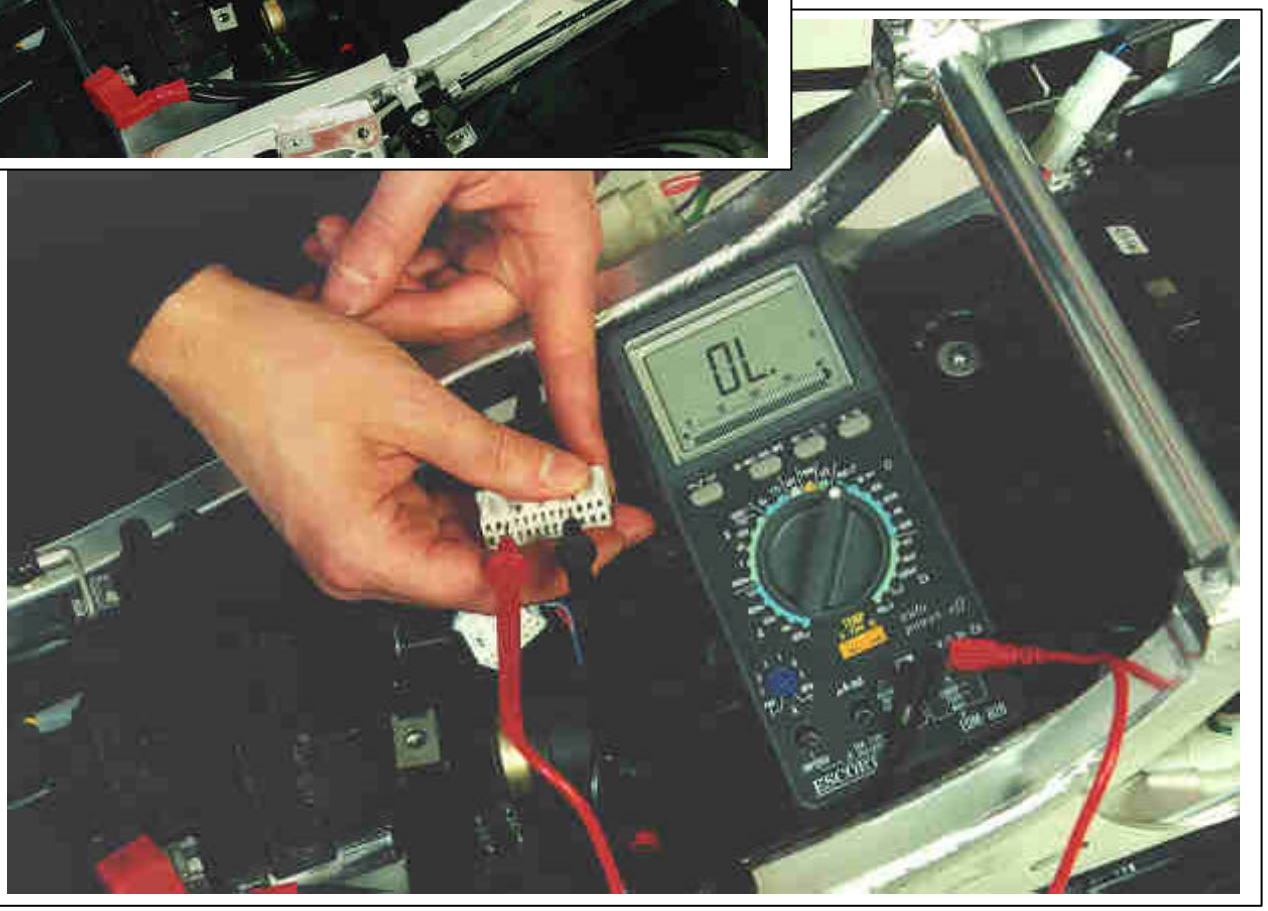
The main electrical components' connections to the ECU are shown in the outline wiring diagram in fig.:



In more detail, the terminals refer to the components shown in the table; the standard ohmic values are also given:

DESCRIPTION OF COMPONENT	NUM.	ECU TERMINALS	CONNECTOR (L=LEFT, R=RIGHT)	STANDARD VALUE	WIRE COLOUR
CAMSHAFT SENSOR	2	2 10	R R	190-300 OHM	PURPLE/BLACK GREY/BLACK
THROTTLE VALVE SENSOR	3	15 3 4	L R R	2,87 – 3,4 KOHM AT 20 °C (3-4 VARIABLE RESISTANCE FUNCTION OF ANGLE)	BLUE/RED BROWN/WHITE BROWN/YELLOW
INTAKE PRESSURE SENSOR.	4	15 3 5	L R R	**10 - 15 KOHM** SEE COMP CHECK	BLUE/RED BROWN/WHITE PINK
H20 THERMISTOR	5	15 6	L R	1,9-2,9 KOHM	BLUE/RED RED/BLACK
AIR THERMISTOR	6	15 13	L R	IDEM	BLUE/RED RED/GREEN
TIP OVER SENSOR	7	7 14	R R	OPEN	GROUND RED
PICK UP	21	9 1	R R	190-300 OHM	WHITE/YELLOW BLUE/YELLOW
GND		11-10-23-2-16-7	L		ALL BLUE/GREEN
FRONT INJECTOR	44	8 9	R R	11-17 OHM AT 20°C	GREEN/BLACK GREY/RED
REAR INJECTOR	45	8 7	R R	11-17 OHM AT 20 °C	GREEN/BLACK BROWN/RED
HT COIL	23	1 12	L L	3-5 OHM	GREEN/GREY LIGHT BLUE/YELLOW
HT COIL	24	1 13	L L	3-5 OHM	GREEN/GREY LIGHT BLUE/WHITE
HT COIL	25	1 25	L L	3-5 OHM	GREEN/GREY RED/GREY
HT COIL	26	1 26	L L	3-5 OHM	GREEN/GREY ORANGE/WHITE
TEST CONNECTOR	68	19	L		GREEN/WHITE
VACUUM SWITCH	28	1 5	L L	OPEN OR CLOSE (NORMALLY OPEN)	GREEN/GREY GREY/YELLOW

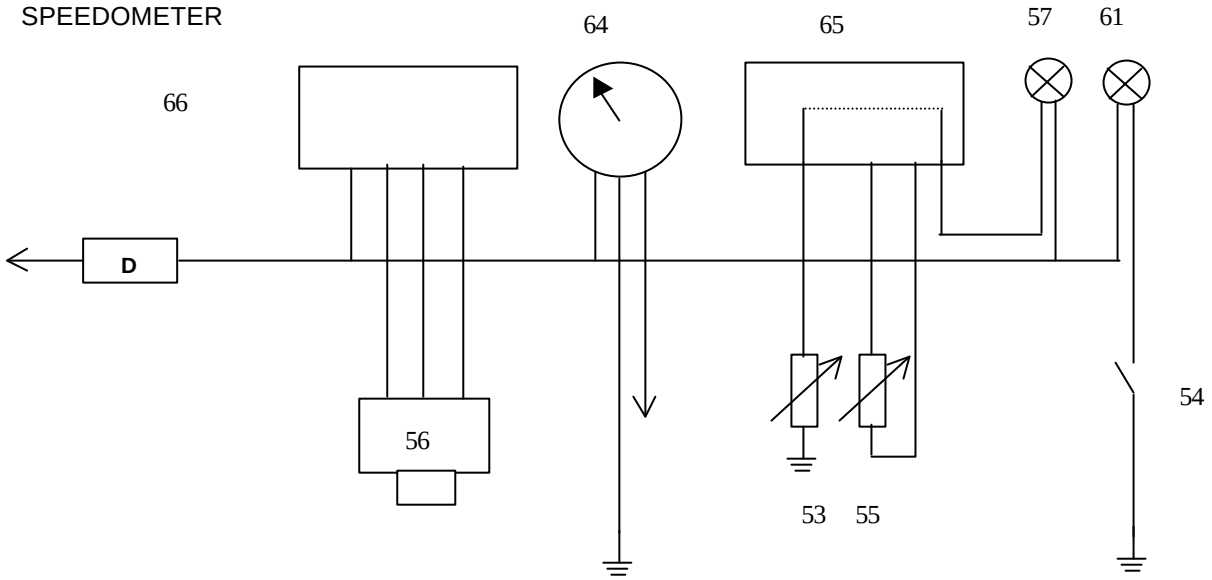




DASHBOARD ELECTRIC WIRING DIAGRAM:

LEGENDA:

D=15 AMP FUSE
53= FUEL WARNING LIGHT SENSOR
54= OIL PRESSURE SWITCH
55= WATER TEMP. THERMISTOR
56= SPEED SENSOR
57= FUEL WARNING LIGHT
61= OIL PRESSURE WARNING LIGHT
64= REV COUNTER
65= MULTIFUNCTION DISPLAY
66= SPEEDOMETER



CHECK H20 TEMPERATURE INDICATOR

DISCONNECT THE THERMISTOR CONNECTOR

Connect the following resistors to the connector and check the display reading:

COLD: R=3000 ohm

60 Degrees (err10%) with R= 580 ohm
90 Degrees (err10%) with R= 245 ohm

If the readings are correct, check the thermistor in the same way as described for the H2O thermistor

CHECK 11: SPEEDOMETER CHECK:

- Check the connections

WITH THE ENGINE OFF:

1) With the key ON, measure the voltage between the green/purple and blue/orange wires without disconnecting the connectors. The reading should be more than 9 Volts dc.

2) Measure the voltage between the grey/white and blue/orange wires without disconnecting the connectors. The reading should be more than 6 Volts dc.

3) Starting from test 2, turn the wheel so that a screw comes on to the sensor; at that moment the voltage should go to zero for about 2 sec. and then back to 6 Volts.

If test 1 doesn't give the above results => dashboard defective

If test 1 is correct but test 2 wrong => sensor defective

If test s1 and 2 are correct but test 3 wrong => sensor defective

If test s1, 2 and 3 are correct but the speed isn't shown on the dashboard => dashboard defective

CHECK 12: TACHOMETER CHECK:

Check that there is voltage between the green and blue/green wires with the key ON

Check the continuity (tester in ohmic scale) on the grey/purple wire between the dashboard and the ECU

Try changing the dashboard with one you are sure that works

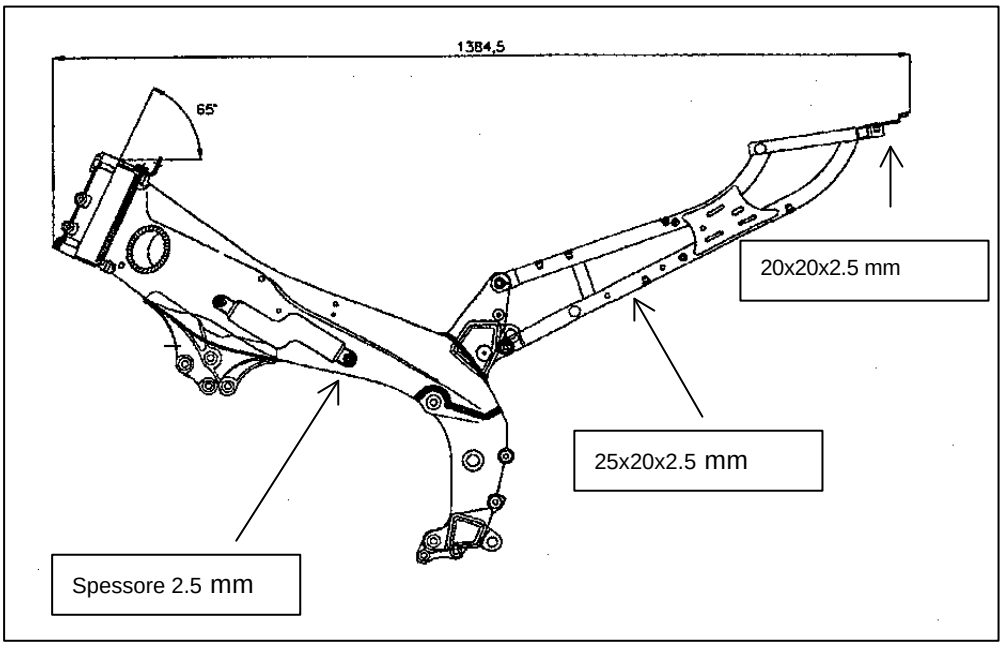
SECTION 6

FRAME

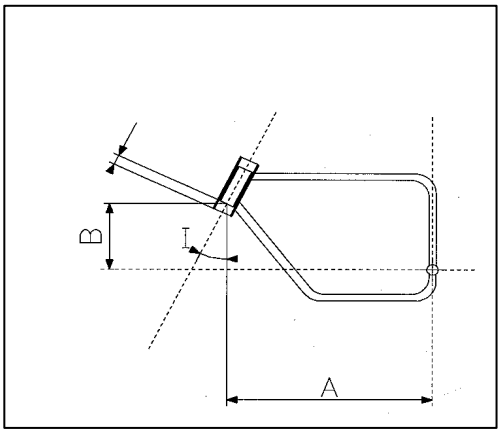
The RSV1000 frame is a highly rigid aluminium structure, with a flexural rigidity of 650 Kgm/°. It is made up of a series of shell-cast parts: steering tube, engine front mounting plate, swingarm pin mounting plate, where the rear of the shock absorber is also attached, and press-forged aluminium plate parts; the same applies to the four sections (2 internal and 2 external) that form the side fairings, with a special polished finish.
Given the high rigidity of the frame, there is no longer any need for the classical cradle around the lower part of the engine, thus reducing the overall weight.

The fairings are lined inside with soundproofing material to reduce noise.

The pillar subframe is an extruded aluminium, square-section structure bolted to the central frame.



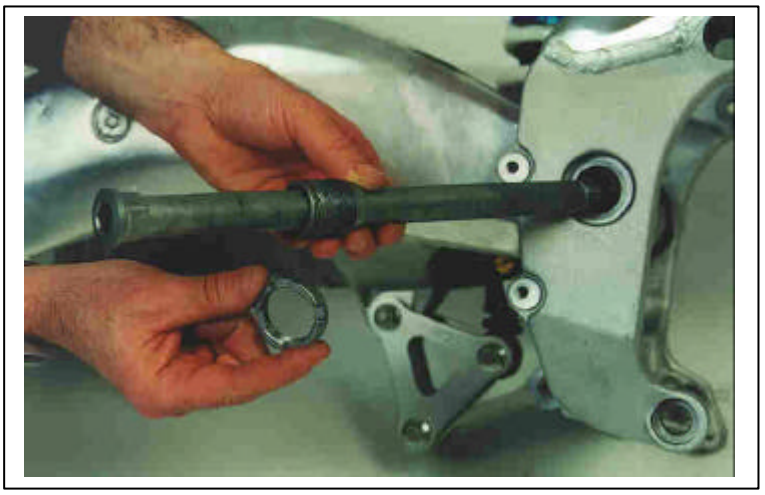
FRAME WEIGHT KG 9,9
PILLAR SUBFRAME WEIGHT KG 2.3
INSTRUMENTS SUPPORT WEIGHT KG 0,750
FORK ANGLE 25°
TRAIL mm 100



FRAME MARKING:

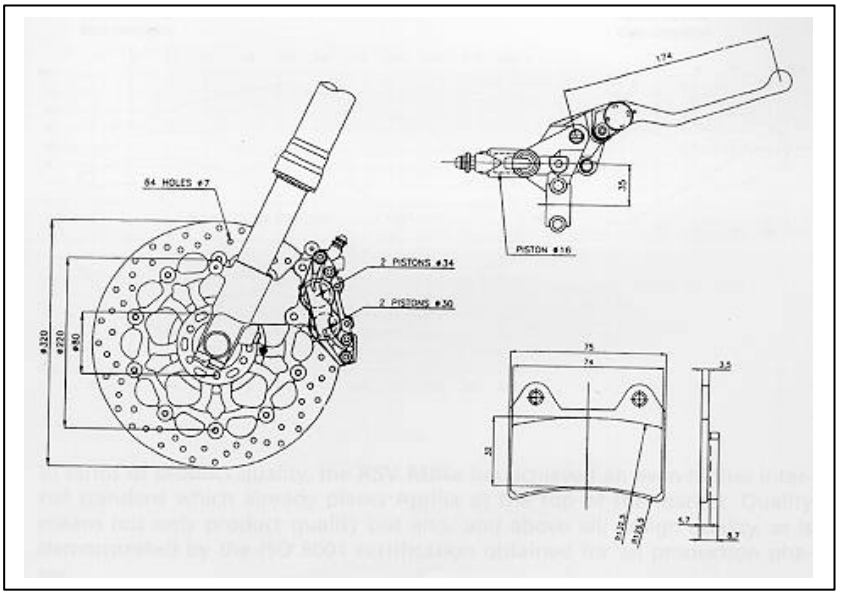
ITALY: ZD4ME0000TN000000
GERMANY: ZD4MEA000TN000000
FRANCE: ZD4MEC000TN000000
A=726.98 mm
B= 322.3 mm
I= 25°

NOTE: FOR THE REMOVAL AND REFITTING OF THE ENGINE AND SWINGARM ON THE FRAME, SPECIAL WRENCHES MUST BE USED FOR UNSCREWING THE RING-TYPE LOCKNUTS ON THE 2 ENGINE FIXING POINTS (RH SIDE) AND ON THE RH SIDE OF THE SWINGARM PIN.



SECTION 7
BRAKING SYSTEM

The brakins systems of RSVmille are the best you can have on a production bike.
Aprilia has developed them together with Brembo, company leader in this sector, and this braking systems offers an excellent MODULARITA' through a 4 position adjusting lever. The braking pads are studied for informing the rider when the thickness of the braking element is lower than 1 mm.



FRONT BRAKE

DISK: Steel
Thickness: 5 mm
Ex. diameter: 320 mm
Calipers: 4 opposite pistons
Br. pistons diam.: 2x 30 mm - 2x 34 mm
Braking pads: i/d 450FF - TOSHIBA TT 2802 (synterized)
Br. pads surface: 23,68 cm²
Br. pump diam.: 16 mm

REAR BRAKE

DISK: Steel
Thickness: 5 mm
Ex. diameter: 220 mm
Calipers: 2 opposite pistons
Br. pistons diam.: 2x 32 mm
Braking pads: i/d 450FF - TOSHIBA TT 2802
Br. pads surface: 16,17 cm²
Br. pump diam.: 11 mm

SECTION 8
REAR SHOCK ABSORBER

The rear shock absorber of the RSVmille is a modern complete adjustable unit, like the front suspension.

The shock absorber has a separate oil tank and a gas chamber to compensate the volume variations of oil due to temperature.

Adjustments

1) Hydraulic functions

The shock absorber can be registered separately for compression effect and rebound.

B- Compression: in order to have a softer setting, turn the knob anticlockwise. Turn it clockwise for having a hardener setting. The total setting positions are 40.

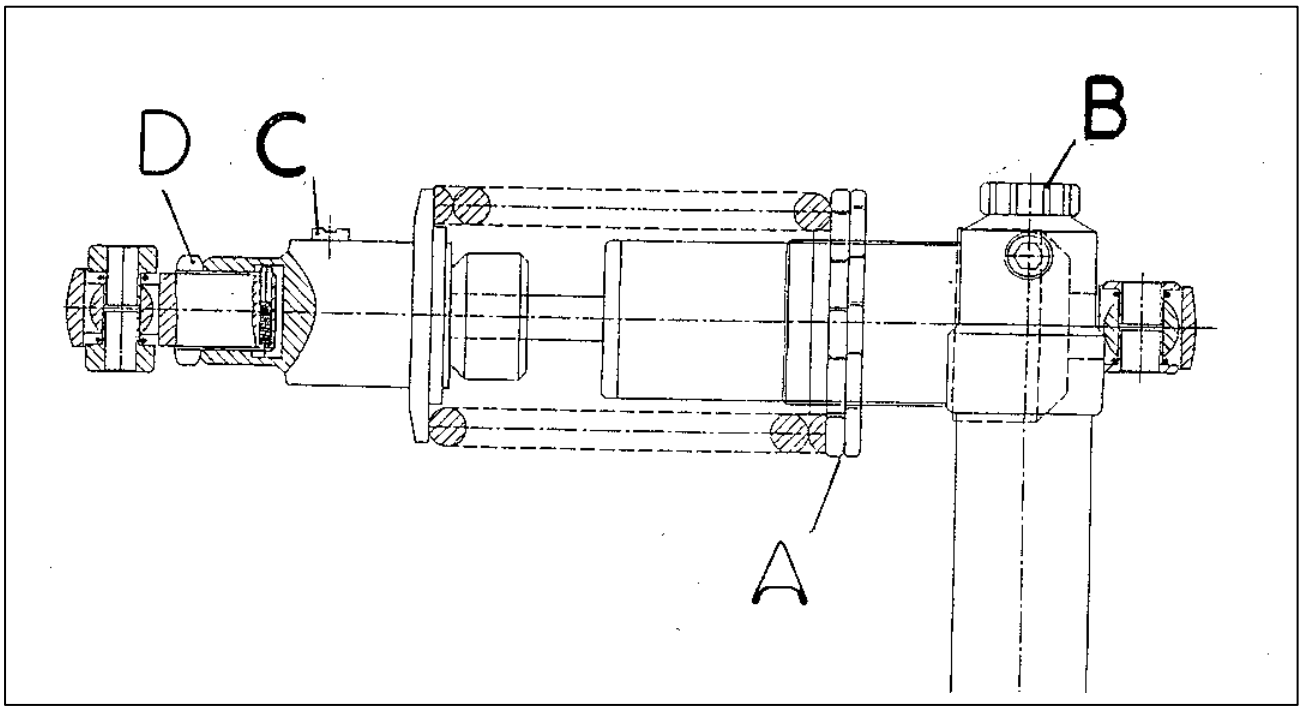
C- Rebound: in order to have a softer setting, turn the setting screw anticlockwise. Turn it clockwise for having a hardener setting. The total setting positions are 17.

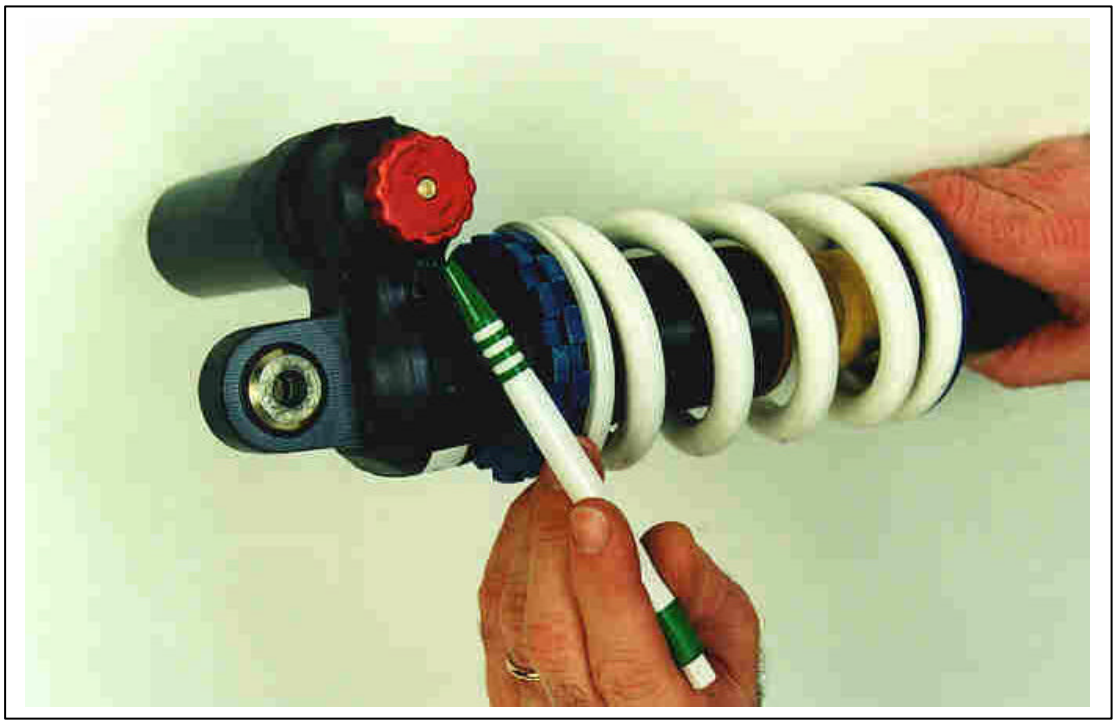
2) Mechanic functions

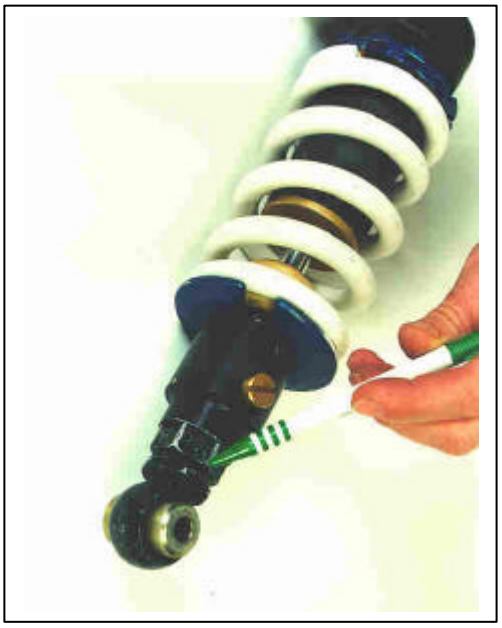
The shock absorber can be registered on spring preload and lenght.

A- Spring preload: in order to have a hardener response of the shock absorber, tight the preload spring ring-nut and the lockring-nut. To set is softer untight the lockring-nut and the ring-nut.

D- Lenght: in order to set the lenght of the shock absorber, untight the locknut on the bottom. Then turn the axle for reaching the requested position. Finally tight the locknut again. The maximum setting lenght is 7,5 mm, for a maximum total lenght of the shock absorber of 330 mm.







FRONT FORK SPECIFICATION

BEARING PIPE DIAMETER: 43 mm

STROKE: 127 mm

REBOUND ADJ.:

COMPRESSION EFFECT: MAX 2 TURN

SPRING PRE-LOAD: MAX 2 TURN

SPRING PRE-LOAD: MAX 25 mm // MIN. 10 mm

SPRING OPERATION: 284 mm

OIL Q.TY: 520 CC
OIL LEVEL: 118 mm

SECTION 09

PBTL SYSTEM

The PBTL system on the RSV 1000 reduces the 'braking' torque transmitted by the engine during deceleration.

OPERATING PRINCIPLE:

Line 1 is connected to the intake passage whereas line 2 – downstream of the retaining valve – is connected to the airbox via the throttle valve. Line 3 links line 2 to the airbox when the throttle valve opens to an angle greater than 10-12 degrees.

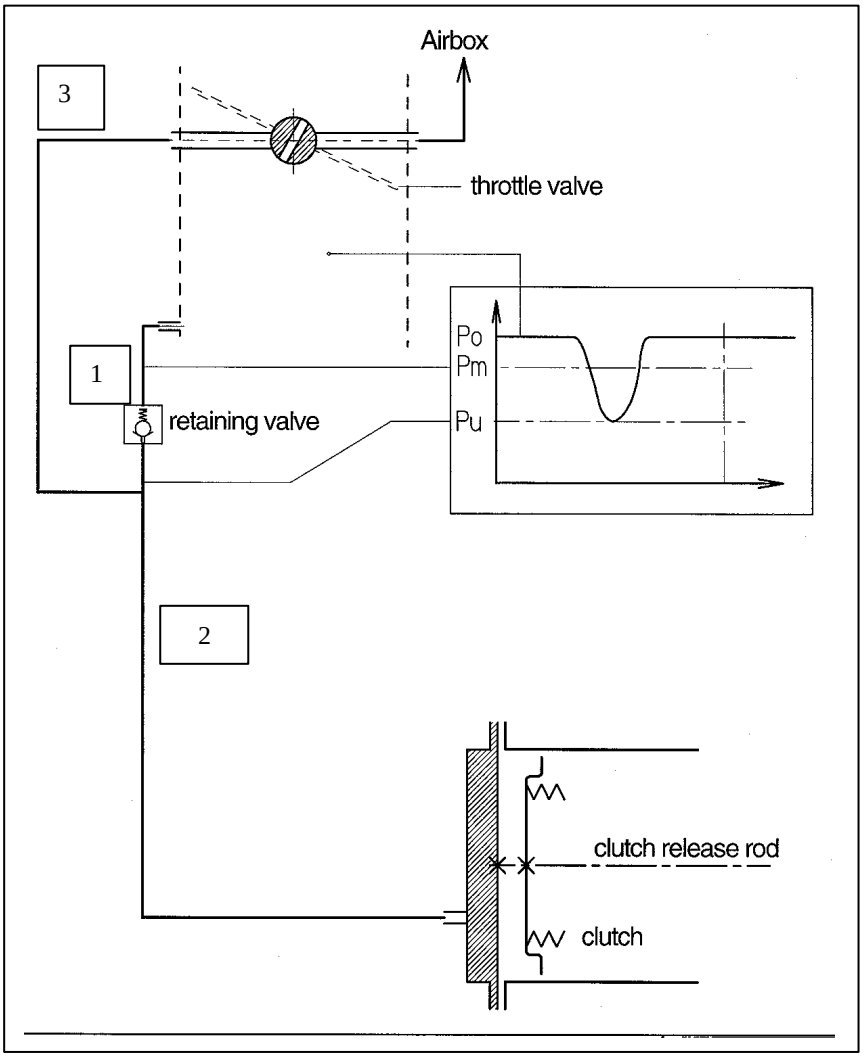
During deceleration, the system configuration is as shown in the figure.

The negative pressure in the intake passages is transmitted to the clutch membrane via line 1+2.

The 'retaining' valve (non-return) comes into play and stabilises the pressure in the line.

Consequently, the clutch discs slip and reduce the torque.

During acceleration (throttle valve >12°), the valve, connected on the throttle unit axis, links up line 2 with the airbox, thus cancelling out the pressing effect on the clutch unit and taking the clutch pack back to its original position.

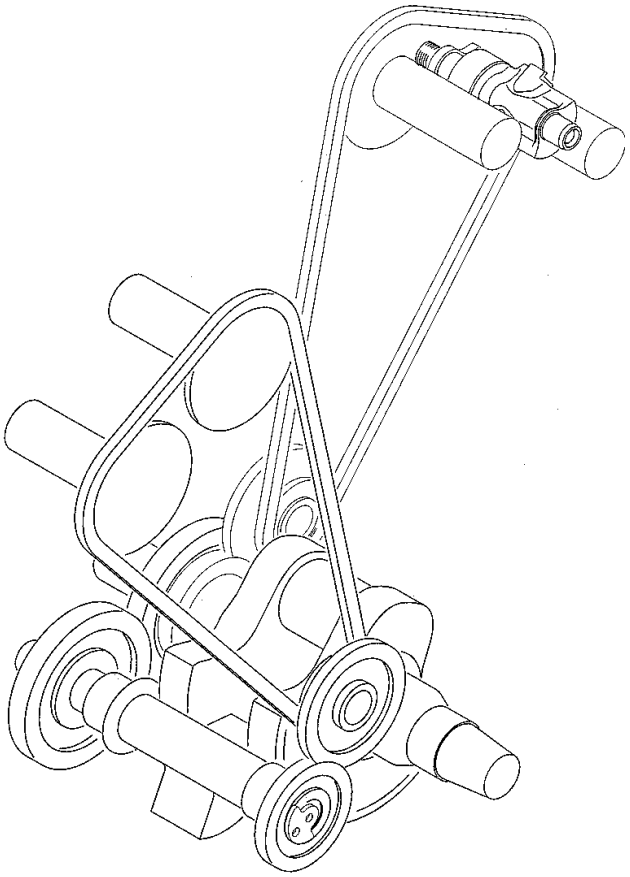


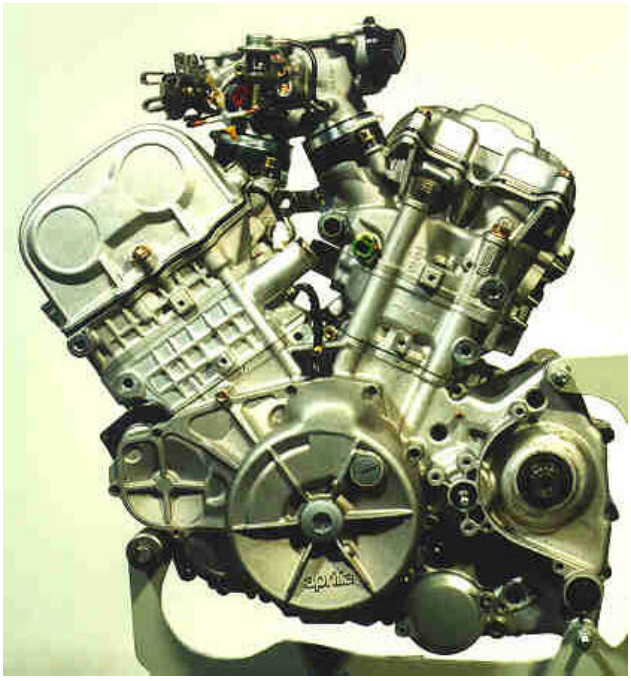
SECTION 10

TIMING SETTING OF RSV MILLE ENGINE

REAR CYL # 2

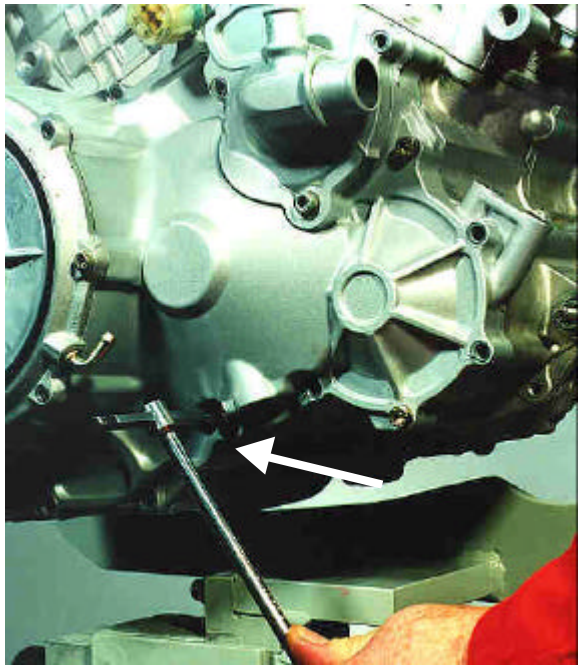
FRONT CYL # 1



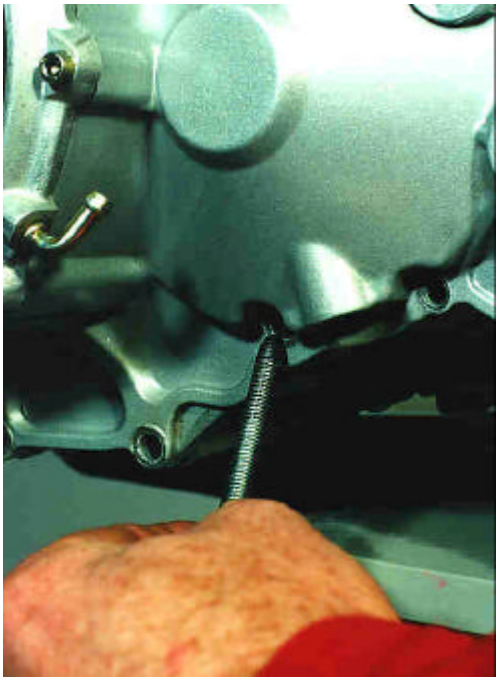


1. FIXING CRANKSHAFT

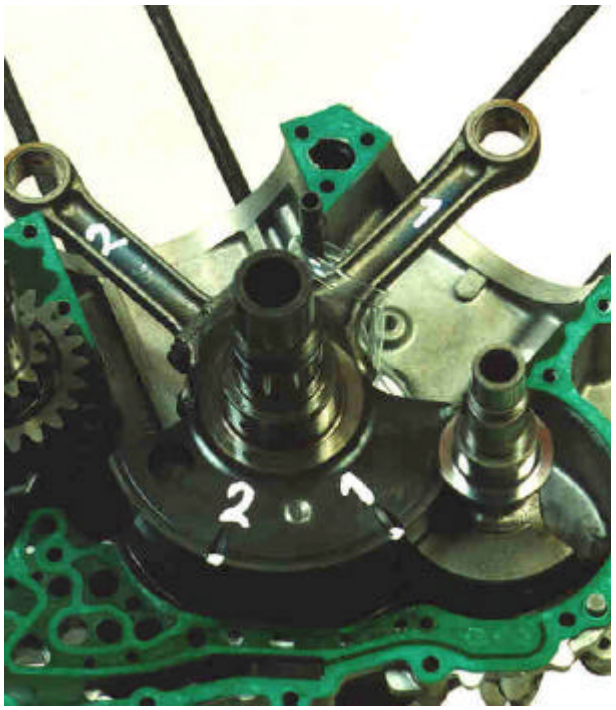
1.1 REMOVE THE SCREW INDICATED WITH THE ARROW – CLUTCH SIDE



1.2 INSERT FIXING SCREW,AFTER REACHING THE TDC OF THE REQUESTED CYLINDER



1.3 DETAIL OF THE FIXING POINTS ON THE CRANKSHAFT



ATTENTION !!!

THE TIMING SETTING OF EACH CYLINDER MUST BE DONE AFTER POSITIONING THE FIXING SCREW ON THE RESPECTIVE T.D.C. (TOP DEAD CENTER) POINT.

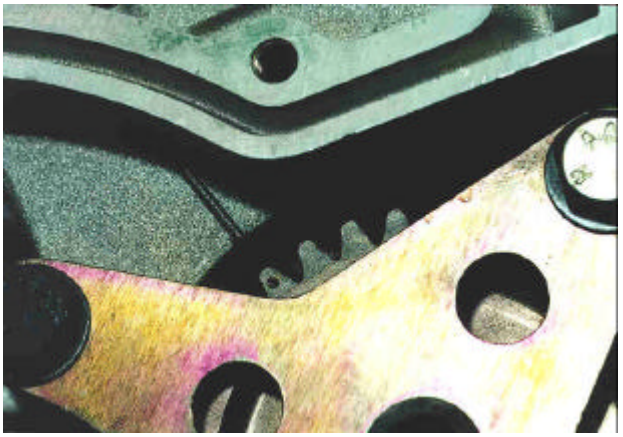
FIRST SET THE ALIGNEMENT OF THE CYLINDER # 2 AND THEN THE ALIGNEMENT OF CYLINDER #1.

AFTER SETTING THE ALIGNEMENT OF CYLINDER #2 ROTATE THE CRANKSHAFT OF 420° DEGREES AND THEN SET THE ALIGNEMENT OF CYLINDER #1.

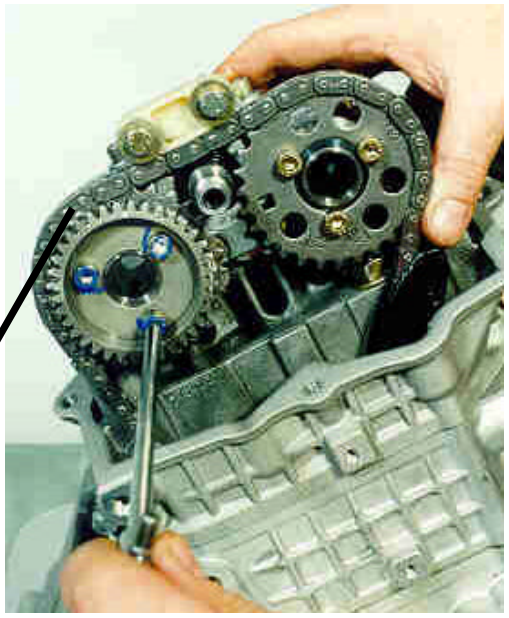
2. TIMING SETTING OF THE REAR CYLINDER (# 2)

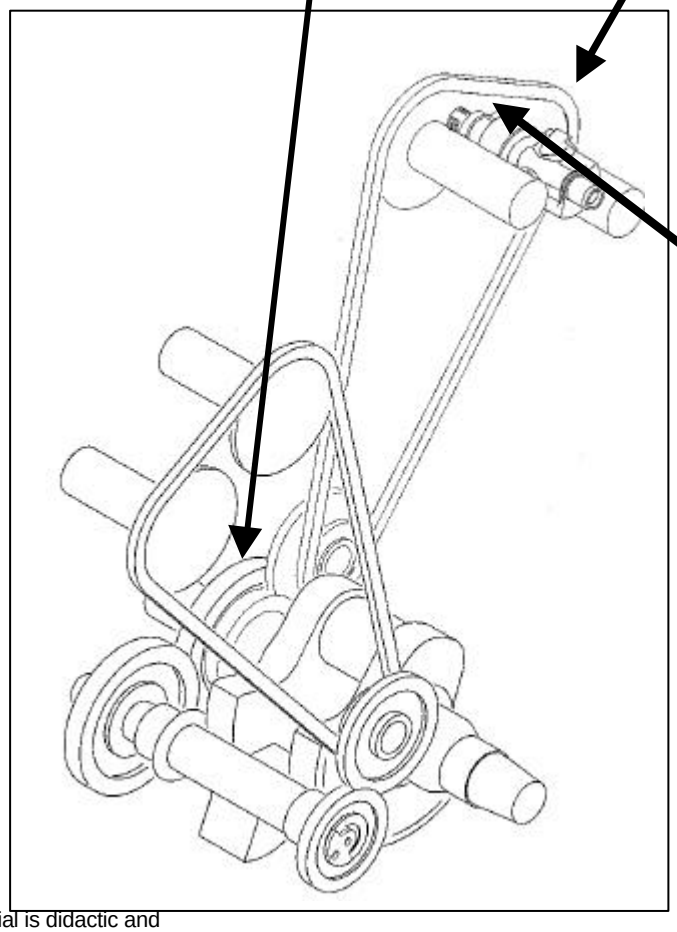
3.

2.1 ALIGNEMENT OF THE INTERMEDIATE GEAR USING THE PRINTED REFERENCES ON CRANKCASE

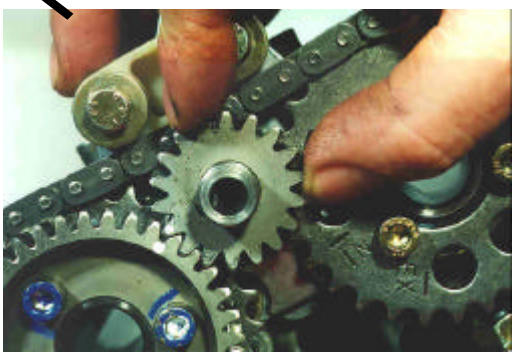


2.2 ALIGNEMENT OF THE CAMSHAFT GEARS WITH THE PRINTED REFERENCES THE SCREWS OF THE LEFT GEAR (EXHAUST) ARE LONGER THE THOSE ON THE RIGHT



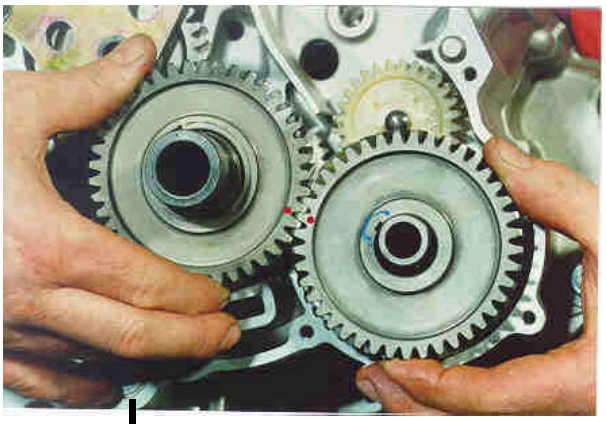


2.3 ALIGNEMENT OF THE SECONDARY BALANCE SHAFT USING THE PAINTED REFERENCES

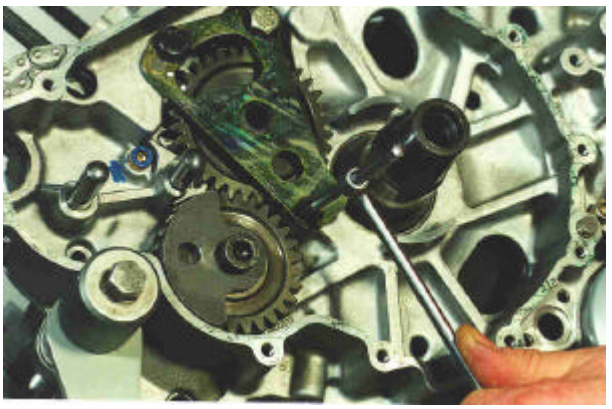


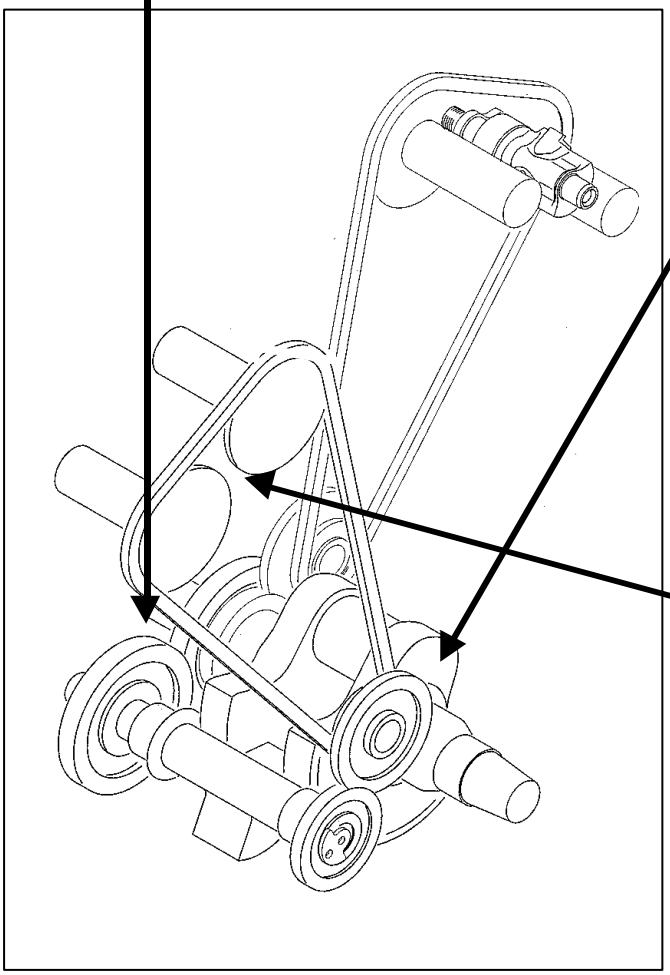
TIMING SETTING OF THE FRONT CYLINDER (# 1)

3.1 ALIGNEMENT OF CRANKSHAFT AND PRIMARY BALANCESHAFT WITH PAINTED REFERENCES

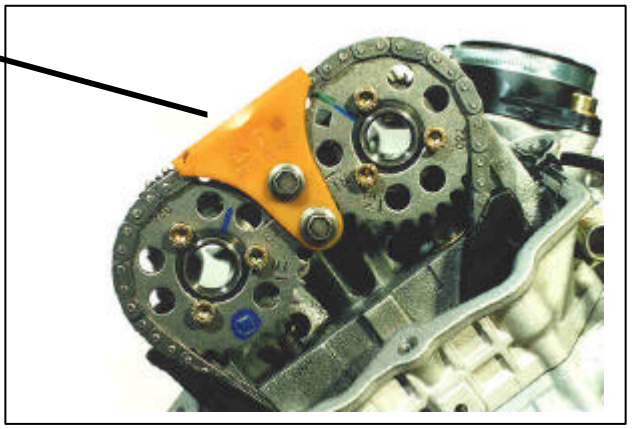


3.2 ALIGNEMENT OF INTERMEDIATE GEAR WITH THE PAINTED REFERENCE ON THE PLATE





3.3 ALIGNEMENT OF THE CAMSHAFT GEARS WITH THE PRINTED REFERENCES



Aprilia Consumer Service Spa
Technical Service and Training
Release 4 july 99

SECTION 11: GENERAL DATA

RSV MILLE

TECHNICAL DATA

1. TECHNICAL DATA

DIMENSIONS	Max. length	2080 mm
	Max. length (rear mudguard extension included)	2140 mm
	Max. width	720 mm
	Max. height (front part of the fairing included)	1170 mm
	Seat height	820 mm
	Distance between centres	1415 mm
	Min. ground clearance	130 mm
	Weight ready for starting (fluids and fuel included)	221 kg
ENGINE	Type	60° longitudinal V-type, two-cylinder, 4-stroke, with 4 valves per cylinder, DOHC.
	Number of cylinders	2
	Total displacement	997.6 cm³
	Bore / stroke	97 mm / 67.5 mm
	Compression ratio	11.4 ± 0.5 : 1
	Starting	electric
	Engine idling rpm	1200 ± 100 rpm
	Clutch	multidisc in oil bath, with hydraulic control on the left side of the handlebar and PPC device.
	Lubrication system	dry pan with separate oil tank and cooling radiator
	Air cleaner	with dry filter cartridge.
	Cooling	liquid-cooled
CAPACITY	Fuel (reserve included)	20 l
	Fuel reserve	4.5 ± 1 l
	Engine oil	oil change 3700 cm³ - oil and oil filter change 3900 cm³
	Fork oil (per rod)	520 ± 2.5 cm³
	Coolant	2.5 l (50% water + 50% antifreeze with ethylene glycol)
	Seats	2
	Vehicle max. load (driver + passenger + luggage)	182 kg

TRANSMISSION	Type			mechanical, 6 gears with foot control on the left side of the engine	
GEAR RATIOS	Ratio	Primary	Secondary	Final ratio	Total ratio
	1st	31/60 = 1 : 1.935	14/35 = 1 : 2.500	17 / 42 = 1 : 2.470	11.948
	2nd		16/28 = 1 : 1.750		8.368
	3rd		19/26 = 1 : 1.368		6.543
	4th		22/24 = 1 : 1.090		5.216
	5th		23/22 = 1 : 0.956		4.573
	6th		27/23 = 1 : 0.851		4.073
DRIVE CHAIN	Type			endless (with no connection link) with sealed links	
	Model			525	
FUEL SUPPLY SYSTEM	Type			electronic injection	
	Choke			Ø 51 mm	
FUEL SUPPLY	Fuel			premium grade unleaded petrol, min. O.N. 95 (N.O.R.M.) and 85 (N.O.M.M.).	
FRAME	Type			two-beam, with cast and stamped sheet elements	
	Steering inclination angle			25°	
	Fore stroke			97 mm	
SUSPENSIONS	Front			upside-down telescopic adjustable fork with hydraulic operation, rod Ø 43 mm	
	Stroke			127 mm	
	Rear			Oscillating rear fork in light alloy with differentiated profile arms and hydropneumatic adjustable mono-shock absorber	
	Wheel stroke			135 mm	
BRAKES	Front			with double floating disc - Ø 320 mm, calipers with four pins with differentiated diameter	
	Rear			disc brake - Ø 220 mm, caliper with double pin	
WHEEL RIMS	Type			light alloy	
	Front			3.50 x 17"	
	Rear			6.00 x 17"	
FRONT TYRE	Type			120 / 70 ZR - 17"	
	Inflation pressure solo rider			230 kPa (2.3 bar)	
	Inflation pressure rider with passenger			230 ± 10 kPa (2.3 ± 0.1 bar)	

may be changed following the technical development of the product

REAR TYRE	Type	190 / 50 ZR - 17"
	Alternative	180 / 55 ZR - 17"
	Inflation pressure solo rider	250 kPa (2.5 bar)
	Inflation pressure rider with passenger	280 ± 10 kPa (2.8 ± 0.1 bar)
SPARK PLUGS	Standard	NGK R DCPR9E
	Alternative	NGK R DCPR8E
	Spark plug gap	0.6 ÷ 0.7 mm
	Resistance	5 kΩ
ELECTRIC SYSTEM	Battery	12 V - 12 Ah
	Main fuses	30 A
	Secondary fuses	15 A
	Generator (with permanent magnet)	12 V - 350 W
BULBS	Low beam (halogen)	12 V - 55 W
	High beam (halogen)	12 V - 60 W
	Front parking light	12 V - 5 W
	Direction indicators	12 V - 10 W
	Rear parking light/ number plate light/stoplight	12 V - 5 / 21 W
	Revolution counter	12 V - 2 W
	Left multifunction display	12 V - 2 W
	Right multifunction display	12 V - 2 W
WARNING LIGHTS	Neutral	12 V - 3 W
	Direction indicators	12 V - 3 W
	Fuel reserve	12 V - 3 W
	High beam	12 V - 3 W
	Stand down	12 V - 3 W
	Engine oil pressure	LED
	Red line	LED

2. LUBRICANT CHART

LUBRICANT CHART

Engine oil (recommended): IP EXTRA RAID, SAE 15W - 50
As an alternative to the recommended oil, it is possible to use high-quality oils with characteristics in compliance with or superior to the CCMC G-4, A.P.I. SG. specifications.

Fork oil (recommended): IP F.A. 5W or IP F.A. 20W fork oil.
If you need an oil with intermediate characteristics in comparison with the two recommended products, these can be mixed as indicated below:

SAE 10W IP F.A. 5W 67% of the volume, + IP F.A. 20W 33% of the volume.

SAE 15W IP F.A. 5W 33% of the volume, + IP F.A. 20W 67% of the volume.

Bearings and other lubrication points (recommended): IP AUTOGREASE MP.
As an alternative to the recommended product, use high-quality grease for rolling bearings, working temperature range -30°C.... +140°C, dripping point 150°C... 230°C, high protection against corrosion, good resistance to water and oxidation.

Protection of the battery poles: neutral grease or vaseline.

Spray grease for chains (recommended): IP CHAIN SPRAY.

Brake fluid (recommended): IP F.F., DOT 5 (DOT 4 compatible).

Use new brake fluid only.

Clutch fluid (recommended): IP F.F., DOT 5 (compatible with DOT 4)

Use new clutch fluid only.

Engine coolant (recommended): IP ECOBLU –40°C.

Use only antifreeze and anticorrosive without nitrite, ensuring protection at -35°C at least.

3.PRELIMINARY CHECKING OPERATIONS:

PRELIMINARY CHECKING OPERATIONS

Component	Check	Page
Front and rear disc brakes	Check the functioning, the idle stroke of the control levers, the fluid level and make sure there are no leaks. Check the wear of the pads. If necessary, top up the fluid tank.	31, 32, 33, 72
Accelerator	Make sure that it works smoothly and that it is possible to open and close it completely, in all steering positions. If necessary, adjust and/or lubricate it.	73
Engine oil	Check and/or top up if necessary.	30, 54
Wheel/tyres	Check the tyre surface, the inflation pressure, wear and tear and any damage.	39
Brake levers	Make sure that they work smoothly. Lubricate the articulations and adjust the stroke if necessary.	35, 36
Clutch	Check the operation of the clutch, the idle stroke of the control lever, the fluid level and any leaks. If necessary, top up the fluid; the clutch must operate without jerking and/or slipping.	35
Steering	Make sure that the steering rotates smoothly, without any clearance or slackening.	—
Side stand	Make sure that it operates correctly. Make sure that when the stand is let up or down there is no friction and that the spring tension brings it back to its normal position. If necessary, lubricate joints and hinges. Make sure that the safety switch operates correctly. If necessary, lubricate joints and hinges. Make sure that the safety switch on the side stand operates correctly.	80, 81
Fastening elements	Make sure that the fastening elements are not loose. If necessary, adjust or tighten them.	—
Drive chain	Check the slack.	62, 63
Fuel tank	Check the level and refuel if necessary. Check the circuit for leaks. Make sure that the fuel cap is correctly closed.	30, 64
Coolant	The coolant level in the expansion tank must be included between the "**FULL**" and "**LOW**" marks.	37, 38
Engine stop switch (○ - ⊗)	Make sure that it operates correctly.	25
Lights, warning lights, horn and electric devices	Check the proper functioning of the acoustic and visual devices. Change the bulbs or intervene in case of failure.	75÷85

4. SERVICE MAINTENANCE CHART

OPERATIONS TO BE CARRIED OUT BY THE **aprilia** Official Dealer

Component	After running-in (1000 km) (625 mi)	Every 7500 km (4687 mi) or 8 months	Every 15000 km (9375 mi) or 16 months
Rear suspension linkage bearings			C
Steering bearings and steering	C	C	
Wheel bearings		C	
Tappet clearance	R		R
Braking systems	C	C	
Cooling system		C	
Clutch fluid	every year: S		
Brake fluid	every year: S		
Coolant	every 2 years: S		
Fork oil	After the frist 7500 km (4687 mi): S / every 22500 km (14000 mi): S		
Brake pads	if worn: S		
Nut, bolt, screw tightening	C	C	
Suspensions and attitude	C		C
Fuel pipes		C	every 4 years: S

C = check and clean, adjust, lubricate or change, if necessary; **P** = clean; **S** = change; **R** = adjust.
Carry out the maintenance operations more frequently if you use the vehicle in rainy and dusty areas, on uneven ground or on racetracks.

REGULAR SERVICE INTERVALS CHART

OPERATIONS TO BE CARRIED OUT BY THE **aprilia** Official Dealer (which can be carried out even by the user)

Component	After running-in (1000 km) (625 mi)	Every 7500 km (4687 mi) or 8 months	Every 15000 km (9375 mi) or 16 months
Spark plugs		C	S
Air filter		C	S
Engine oil filter	S	S (*)	
Engine oil filter (on oil tank)			P
Light operation/direction		C	
Fork		C	
Light system	C	C	
Safety switches	C	C	
Clutch fluid		C	
Brake fluid		C	
Coolant			C
Engine oil	S	S (*)	
Tyres	C	C	
Tyre pressure	R	every month: R	
Engine idling rpm	R	R	
Engine oil pressure warning light LED	at every start: C		
Drive chain tension and lubrication	every 1000 km (625 mi): C		
Brake pad wear	before every trip and every 7500 km (4687 mi): C		

C = check and clean, adjust, lubricate or change, if necessary; **P** = clean; **S** = change; **R** = adjust.
Carry out the maintenance operations more frequently if you use the vehicle in rainy and dusty areas, on uneven ground or on racetracks.

(*) = In case of use on racetracks, change every 3750 km (2343 mi).

4.FRAME TORQUE SETTINGS

AIR FILTER BOX					
Description	**Qnty**	**Screw\nut**	**Nm**	**Kgm**	**ref.**
Securing of the air box cover	7	M5	4	0,4	
Securing of the air box to the throttle body	6	M6	8	0,8	
Securing of the air intakes	4	SWP3,9	1	0,1	
Securing of the air sensor support	1	SWP3,9	1	0,1	
FRONT WHEEL					
Description	**Qnty**	**Screw\nut**	**Nm**	**Kgm**	**ref.**
Wheel axel nut	1	M25X1.5	80	8	
REAR WHEEL					
Description	**Qnty**	**Screw\nut**	**Nm**	**Kgm**	**ref.**
Securing of the chain ring	5	M10	50	0,5	L243
Wheel spindle nut	1	M25X1.5	140	14	
COOLING SYSTEM					
Description	**Qnty**	**Screw\nut**	**Nm**	**Kgm**	**ref.**
Three way thermostat	1	M14X1.5	30	3	L572
Securing cooling fan support	2+2	M6	6	0,6	
Securing cooling fan motor to the support	3+3	M4	2	0,2	L243
Cooling liquid exhaust screws	1+1	M6	10	1	L572
Securing of espansion chamber to the ignition coil support	2	M6	10	1	
Securing of the espansion chamber top	1	M28X3	MAN.	MAN.	
Securing filler cap	1	M6	10	1	
BRAKING SYSTEMS					
	Front system				
Description	**Qnty**	**Screw\nut**	**Nm**	**Kgm**	**ref.**
Securing of the right and left brake caliper	2+2	M10X1.25	50	5	
Securing of brake fluid tank	1	M5	5	0,5	
Securing of brake fluid tank support	1	M6	12	1,2	
Securing disk brakes	6+6	M8	30	3	L243
Securing front brake pipe	1	M10X1	20	2	
Brake liquid bleeding valve					
	Rear system				
Description	**Qnty**	**Screw\nut**	**Nm**	**Kgm**	**ref.**
Securing of the caliper	2	M8	25	2,5	
Brake lever pin	1	M8	25	2,5	
Securing of brake fluid tank	1	M5	1	0,1	
Securing of brake pump	1				
Counternut brake axel	1	M6	MAN	MAN.	
Securing of the disk brake	6	M8	30	3	L243
Securing of the rear brake pipe	1	M10X1	20	2	

CLUTCH LEVER					
Description	**Qnty**	**Screw\nut**	**Nm**	**Kgm**	**ref.**
Securing of the clutch lever liquid pipe	1	M10X1	20	2	
Securing of the clutch liquid tank support	1	M6	12	1,2	
Securing of the clutch liquid tank\clutch pump	1	M5	3	0,3	
Clutch liquid bleeding valve	1				
EXAUST SYSTEM					
Description	**Qnty**	**Screw\nut**	**Nm**	**Kgm**	**ref.**
Securing the exaust pipes to the engine	3+3	M8	25	2,5	
Securing the exaust pipe to the central exhaust manifold					
FUEL TANK					
	fuel pump flange				
Description	**Qnty**	**Screw\nut**	**Nm**	**Kgm**	**ref.**
Fuel feedback pipe	1	M6	6	0,6	L243
Securing of the pump support to the flange	3	M5	4	0,4	
Securing wires to the flanges	2	M5	5	0,5	
Lock of the fuel feedbach pipe	1	M6	10	1	L243
Securing of the flange of the output fuel pipe	1	M12X1.5	22	2,2	
Securing fuel level sensor on pump support	2	SWP 2.9X12	1,5	0,15	
Securing of pump wiring to the flange	2	M6	10	1	
	Fuel tank				
Description	**Qnty**	**Screw\nut**	**Nm**	**Kgm**	**ref.**
Securing of the fuel filler cap	3	M5	5	0,5	
Securing of the fuel pump flange to the tank	8	M5	7	0,7	
Front securing of the fuel tank to the frame	2				
Rear securing of the fuel tank to the support					
MOTOR OIL TANK					
Description	**Qnty**	**Screw\nut**	**Nm**	**Kgm**	**ref.**
Tank upper securing screw	1	M6	10	1	
Tank securing nuts					
Oil filter	1	M20X1.5	30	3	
Oil exaust cork	1	M8	15	1,5	
Oil level pipe joints	2	M10X1	20	2	
FRAME/BODYS					
Description	**Qnty**	**Screw\nut**	**Nm**	**Kgm**	**ref.**
Securing of the water coolers	3	M6	5	0,5	
Securing the license plate support to the mudshield	2	M5	2	0,2	
Securing reflector support to the license plate holder	2	M5	3	0,3	
Securing of front mudshield	4	M5	5	0,5	
Mirror securing nuts	1+1				
Securing of mirrors and front fairing to the support	4	M6	5	0,5	
Lower securing of front fairing to the air intakes	2	M5	4	0,4	
Lower securing of front fairing to the air intakes on the intakes	2	M5	4	0,4	
Lower securing of front fairing to the air intakes on the upper side	2	SWP 3.9	2	0,2	
Securing of intake tops	6	M6	5	0,5	

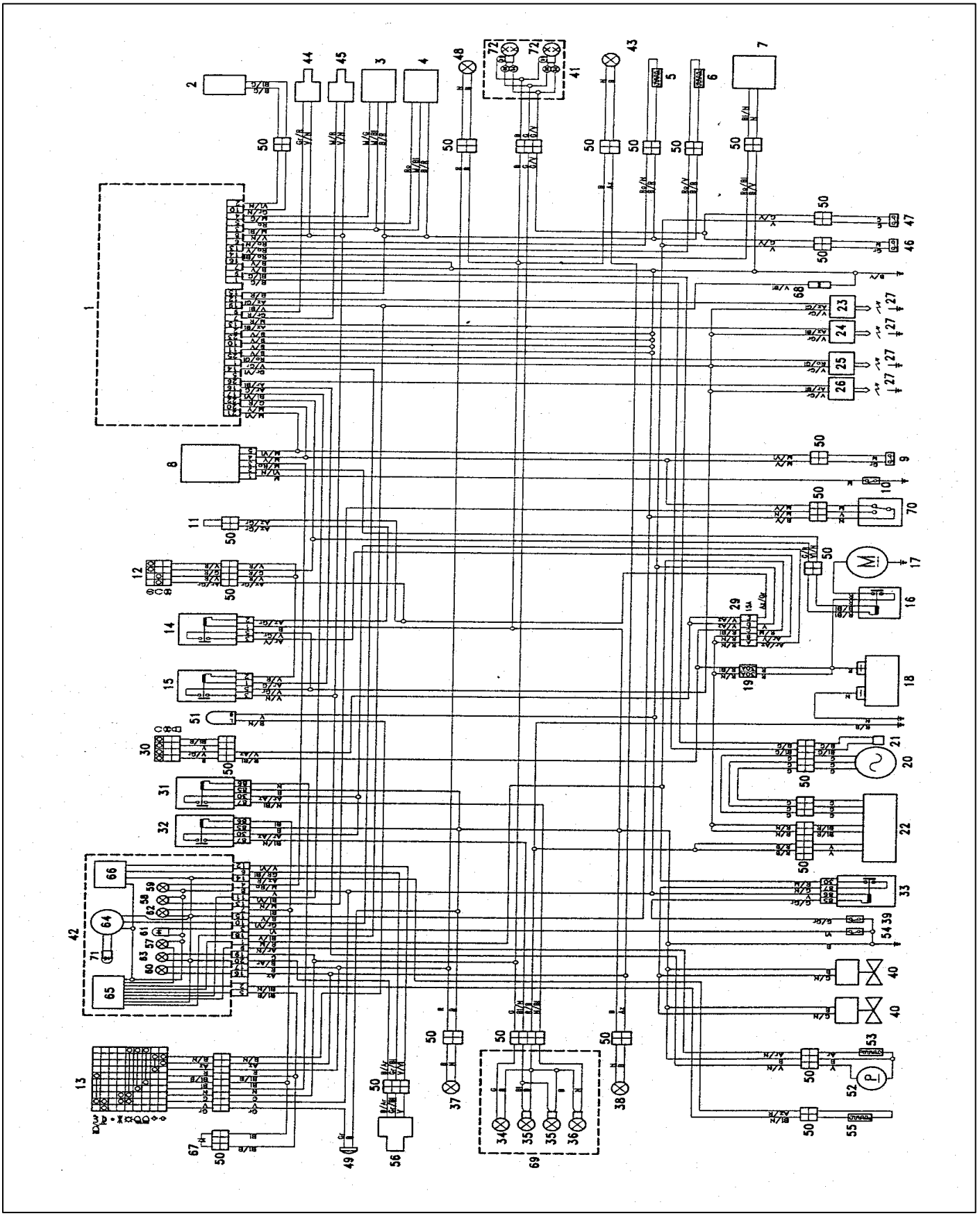
Securing of intakes to the frame and to the support	14	SWP 3.9	2	0,2	
Higer securing of lat. Fairing	2+2	M5	f.1;r.2	0,1;0,2	
Securing of front fairing dashboard lockup	4	M5	2	0,2	
Securing of front fairing\dashboard support					
Lower securing of side fairings to the frame	4	M6	5	0,5	
Securing of exhaust pipe protection to the lower fairing	2	M6	5	0,5	
Securing of lateral panel	4	M6	5	0,5	
Securing saddle bush\locking sistem for saddle	2	M6	5	0,5	
Securing mudshield to the saddle support	4	M6	4	0,4	
Securing of rear fairing to mudshield	6	M5	2	0,2	
Securing of light support to rear fairing	2+2	M5	h.5;l.3	0,5;0,3	
Securing of rear fairing\passenger belt	2	M6	12	1,2	
Securing of frame cover	4	M5	2	0,2	
Securing of internal fairing and side fairing	8	SWP 2.9	1	0,1	
Securing of dashboard to support	3	M6	5	0,5	
Securing of pilot saddle	-	-	-	-	
Securing of saddle rear support	-	-	-	-	
Securing of passenger saddle locking system	-	-	-	-	
Securing of passenger saddle key locking system	-	-	-	-	
Securing of passenger foot rests	-	-	-	-	
Securing of pilot foot rests	-	-	-	-	
Securing pilot foot protection	-	-	-	-	
HANDLEBARS AND SELECTORS					
Description	**Qnty**	**Screw\nut**	**Nm**	**Kgm**	**ref.**
Securing of antyvibration weights	2	M6	12	1,2	
Securing of antyvibration weights ends	2	M18X1	35	3,5	
Securing of handelbars to front forks	2	M8	25	2,5	
Securing of handelbar security screws	2	M6	12	1,2	
Securing of right\left light selector	1	M5X1	2	0,2	
Securing of right\left light selector	1	M5X1	2	0,2	
Securing of front brake lever	2	M5X1	8		
Securing of clutch lever	2	M5X1	8	0,8	

5 ENGINE TORQUE SETTINGS

ENGINE					
CARTER					
Description (were and what)	**Qnty**	**Screw\nut**	**Nm**	**Kgm**	**ref.**
Ballbearing holder (flyweel side)- Flat head screw	1	M6X13	11	1,1	L243
Ballbearing holder (clutch side)- Flat head screw	1	M6X13	11	1,1	L243
Gear shaft ballbearing holder (clutch side)- Flat head screw	2	M6X13	11	1,1	L243
Waterpump intermediategear (clutch side)- circlip	1	10			L648
Crunkcase(left) to crunkcase(right)\ - Cilinder head screw	13	M6X65	11	1,1	
Crunkcase(left) to crunkcase(right)\ - Cilinder head screw	1	M6X80	11	1,1	
Crunkcase(left) to crunkcase(right)\ - Cilinder head screw	5	M6X45	11	1,1	
Crunkcase(left) to crunkcase(right)\ - Cilinder head screw	1	M6X25	11	1,1	
Crunkcase- Magnetic screw	1	M12X1,5	20	2	
Crunkcase- Contact screw	1	M10	4	0,4	L574
Oil filter cover- Cilinder head screw	2	M6X20	11	1,1	
Calibrated jet- Cilinder head screw	1	M6X10	6	0,6	
Bushing (both sides)- Hex socket screw	2	M8X45	25	2,5	
Bushing (clutch side)- Hex socket screw	2	M8X25	25	2,5	
Bushing (Flywheel side)- Cilinder head screw	1	M8X20	25	2,5	
Bushing (Flywheel side)- Cilinder head screw	1	M6X20	11	1,1	L243
ENGINE SHAFT, COUNTERSHAFT, GEARBOX					
Description (were and what)	**Qnty**	**Screw\nut**	**Nm**	**Kgm**	**ref.**
Index lever\ indexdisk- Cilinder head screw	2	M6X20	11	1,1	L243
Primary countershaft (clutch side)- Hex socket nut	1	M22X1,5	150	15	
Engine shaft - Hex socket nut	1	M33X1,5	230	23	L243
Primary countershaft (flywheel side)- Cilinder head screw	1	M10X20	50	5	L648
OILPUMP					
Description (were and what)	**Qnty**	**Screw\nut**	**Nm**	**Kgm**	**ref.**
Oil pump-Self centering screw (on the lower side)	1	M2X1,5			L515
Oil pump body	1				
Oil pump cover- Cilinder head screw	4	M6X45	11	1,1	
CLUTCH					
Description (were and what)	**Qnty**	**Screw\nut**	**Nm**	**Kgm**	**ref.**
Primary Shaft- Hex socket nut	1	M24X1,5	170	17	L648
Clutch springs- Hex. Socket screw	6	M6X25	11	1,1	
Clutch pin- Securing screw	1	M12X1,5	20	2	
Diapragm- Cilinder head screw	8	M5X20	5	0,5	
Clutch drum\Diskpusher- Hex. Screw	3	M8X16	30	3	L648
CILINDER HEAD, CILINDER					
Description (were and what)	**Qnty**	**Screw\nut**	**Nm**	**Kgm**	**ref.**
Valve cover cilinder 1- Cilinder head screw	8	M6X30	11	1,1	
cilinder head 1- Pipe	2	M18X1,5			L243
cilinder head 2- Pipe	1	M18X1,5			L243
Valve cover cilinder 2- Cilinder head screw	4	M6X30	11	1,1	

Valve cover cilinder 2- Cilinder head screw	2	M6X45	11	1,1	
Valve cover cilinder 2- Cilinder head screw	2	M6X55	11	1,1	
cilinder head 2- Locking screw	1	M18X1,5			L243
Cilinder head\exhaust system- Stud screw	6	M8X16\20	10	1	L648
cilinder head 2- Oil bleeding valve	1				L574
cilinder head\crunk- Stud screw	8	M10X171	15	1,5	L243
Cilinder\cilinder head	8	M8X45	30	3	
Cilinder head\stud- Hex. Nut	8	M10	58	5,8	
Cilinder head\cilinder chain room - Cilinder head screw	4	M6X100	12	1,2	
Cilinder head 2- Hex socket screw	2	M6X35	11	1,1	
Cilinder head 2- Hex socket screw	2	M6X20	11	1,1	
Cilinder head 2\Exhayst camshaft\Secondary countershaft gear- Cilinder head screw	3	M6X14	11	1,1	L243
Intake camshaft- Cilinder head screw	6	M6X11,5	11	1,1	L243
Cilinder head 1\ Exhaust camshaft- Cilinder head screw	3	M6X11,5	11	1,1	L243
Cilinder head\secondary camshaft nut- Hex. Nut	1	M14X1	50	5	L243
Ignition unit cover- Spacer	10	M6X23	11	1,1	
Distribuition chain runner- Spacer	2	M6X16	11	1,1	
Cilinder head- Sparkplug	4		18	1,8	
Intake flange- Cilinder head screw	4	M8X25	19	1,9	
Distribuition chain tension adjuster- Locking screw	2	M16X1,5	30	3	
Cilinder head- Temperature sensor	1		20	2	
Cilinder head- Temperature sensor	1		20	2	
Support between Cilinders/ Cilinder head screw	2	M10X40	40	4	
Support between Cilinders	2	M10	40	4	L243
IGNITION SISTEM, STARTING UNIT					
Description (were and what)	**Qnty**	**Screw\nut**	**Nm**	**Kgm**	**ref.**
Ignition sensor\flywheel cover- Self threading	2	M6X16	11	1,1	
Flywheel cover\generator\stator- Cilinder head screw	3	M6X40	11	1,1	L243
Flywheel \ sprag clutch					L648
Sprag clutch- Cilinder head screw	3	M8X16	30	3	L648
Flywheel					L648
Flywheel\engine shaft- Cilinder head screw	1	M16X30	130	13	L648
Flywheel cover\ crunk- Cilinder head screw	12	M6X35	11	1,1	
Flywheel cover- locking screw	1	M24X1,5	3	0,3	
Camshaft sensor\Cilinder head 1- Self threading screw	2	M5X12	4	0,4	L243
Starting motor- Cilinder head screw	2	M6X30	11	1,1	
CLUTCH COVER, WATER PUMP					
Description (were and what)	**Qnty**	**Screw\nut**	**Nm**	**Kgm**	**ref.**
Water pump	1	IMPELLER			
Clutch cover - Oil bulb	1	M10X1	15	1,5	L243
Water pump body- Cilinder head screw	1	M6X25	11	1,1	
Water pump body- Cilinder head screw	3	M6X55	11	1,1	
Clutch cover - Cilinder head screw	11	M6X35	11	1,1	
Clutch cover - Cilinder head screw	3	M8X40	19	1,9	
Clutch cover - Cilinder head screw	1	M8X65	19	1,9	

6 WIRING DIAGRAM



6.1 WIRING DIAGRAM KEY

WIRING DIAGRAM KEY - RSV mille

1) Electronic unit
2) Cam position sensor
3) Throttle valve position sensor
4) Suction pressure sensor
5) Coolant thermistor
6) Air thermistor
7) Fall sensor
8) Diode module
9) Clutch control lever switch
10) Neutral switch
11) Arrangement for the installation of the anti-theft device
12) Right dimmer switch
13) Left dimmer switch
14) Engine stop relay
15) Fuel pump relay
16) Start relay
17) Starter
18) Battery
19) Main fuses (30A) (ignition)
20) Generator
21) Pick up
22) Voltage regulator
23) Rear cylinder coil
24) Rear cylinder coil
25) Front cylinder coil
26) Front cylinder coil
27) Spark plugs
29) Secondary fuses (15A)
A - High beam, low beam
B - ISC, coils, fuel pump.
C - Electric fans, clock.
D - Parking lights, stoplights, horn, dashboard lights, direction indicators.
E - Electronic unit, fuel pump relay, engine stop relay.
30) Ignition switch
31) Low beam relay
32) High beam relay
33) Cooling fan relay
34) Front parking light bulb
35) High beam bulbs
36) Low beam bulb
37) Front right direction indicator
38) Front left direction indicator
39) Thermal switch
40) Cooling fans
41) Rear light
42) Dashboard
43) Rear left direction indicator
44) Front cylinder injector
45) Rear cylinder injector
46) Front stoplight switch
47) Rear stoplight switch
48) Rear right direction indicator
49) Horn
50) Multiple connectors
51) Blinking
52) Fuel pump
53) Low fuel sensor
54) Engine oil pressure switch
55) Coolant temperature thermistor
56) Speed sensor
57) Low fuel warning light
58) Side stand down warning light
59) Neutral warning light
60) Direction indicator warning light
61) Engine oil pressure warning light LED
62) High beam warning light
63) Dashboard bulbs
64) Revolution counter
65) Multifunction display (right side)
66) Multifunction display (left side)
67) Light diode / LAP
68) TEST connectors
69) Headlight
70) Side stand switch
71) Red line warning light LED
72) Rear parking light/stoplight bulbs

X) Dashboard connector (20-way)
Y) Electronic unit connector (26-way)
Z) Electronic unit connector (16-way)

CABLE COLOURS

Ar Orange
Az Light blue
B Blue
Bi White
G Yellow
Gr Grey
M Brown
N Black
R Red
V Green
Vi Violet
Ro Pinck